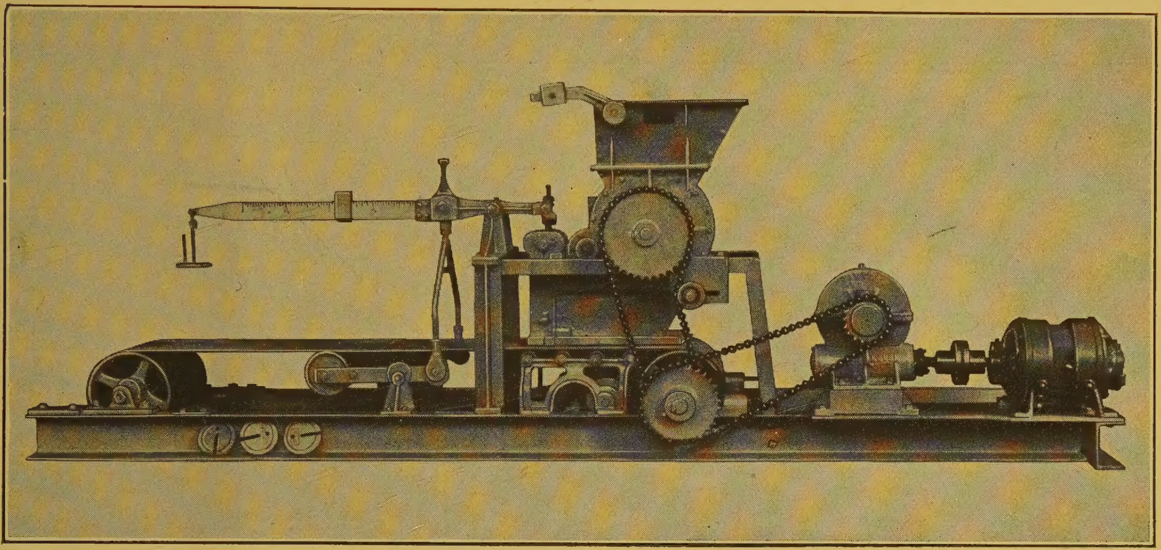
MILL SECTION of

Concrete

Schaffer Poidometers



Photograph showing a Poidometer with new type Hopper

For Feeding Your Tube Mills

We have recently perfected our Non-Flood type Hopper in order to handle finely pulverized material for tube mill feed.

Poidometers equipped with this type Hopper are also being used for proportioning Portland Cement and Hydrated Lime for the manufacture of Trowelite by several eastern manufacturers.

Among the concerns who recently purchased Poidometers are:

Coplay Cement Mfg. Co., Coplay, Pa.; International Portland Cement Company, Ltd., Seattle, Wash.; Kandos Cement Company, Sydney, Australia; Lawrence Portland Cement Co., Thomaston, Maine; Monolith Portland Midwest Company, Laramie, Wyoming; Missouri Portland Cement Company, St. Louis, Mo.; West Penn Cement Company, Butler, Pa.

If you contemplate changes in your mixing department, or your tube mill feed, by all means investigate Schaffer Poidometers.

Write for catalogue number seventy-five

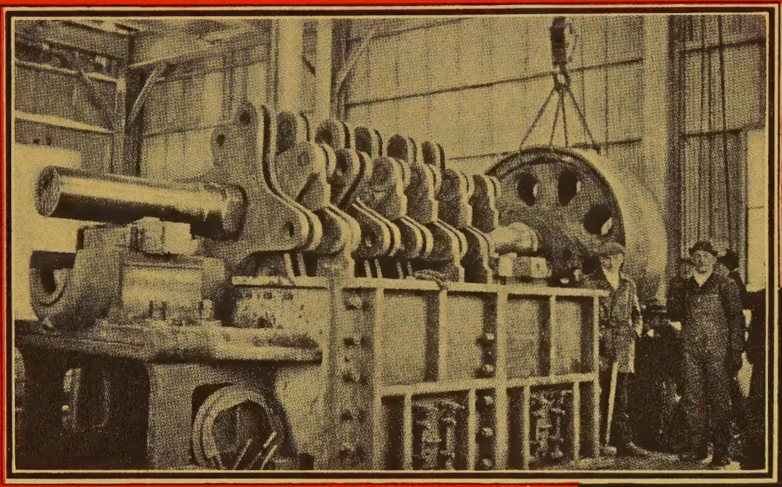
SCHAFFER POIDOMETER COMPANY

2828 Smallman Street Pittsburgh, Pennsylvania

Index to Advertisers on Page 91 of This Section

SOLO HAMMER CRUSHER

DURING ERECTION AT THE PLANT OF THE
KEYSTONE PORTLAND CEMENT CO. BATH, PA.



OUTPUT: 400 TONS CEMENT ROCK PER HOUR:

FEED: 40" X 30" X 25"

PRODUCT IN ONE OPERATION: 5/8 AND UNDER

POWER CONSUMPTION: 300 H.P. DIRECT COUPLED TO MOTOR – 180 R.P.M.

BUILT IN FIVE SIZES FOR ALL KINDS OF ROCK

POLYSIUS CORPORATION

BETHLEHEM TRUST BLDG.

BETHLEHEM, PA.

Index to Advertisers on Page 91 of This Section

MILL SECTION of
Concrete

The Cement Mill Edition of Concrete is edited exclusively for those interested in the manufacture of cement. Its pages are devoted to discussions of plant design, management, operation, production efficiency, chemical research and control, quarry operation, progress and news of the industry.

The Cement Mill Edition also contains all the material published in the corresponding Regular Edition and so provides news of the uses and merchandising of the materials whose manufacture is discussed in the Mill Edition. The Regular Section furnishes mill operating officials and mill executives valuable points of contact with the users of the materials they produce.

Volume 33 August, 1928 Number 2

CONTENTS

Viscosities of Slurries—*(Illus.)* 93

S. E. Hutton of the Pacific Coast Cement Company tells of his studies of the viscosities of clay slips and cement slurries as an aid to economies in operating and design.

Colored Cements in Europe 95

Some sources of coloring materials used to produce colored cements.

June, 1928, Makes Safety History—*(Illus.)* 97

The June safety campaign in cement plants in the United States and Canada results in the establishment of a new record.

Large Scale Blasting in South Australia 99

A description giving the details of a good-sized blast in the limestone quarries of the Adelaide Cement Company.

Editorial 101

A Buyers' Market.

Chemistry of High Early Strength Cements 103

The second and concluding chapter of a translation on this vital subject.

Cement Statistics for June 107

Men and Mills 108

Plant activities and personalities.

Mill Equipment 110

With the Manufacturers 111

In the Construction Section

~

Permanence — an Editorial 25

A. S. T. M. Presents Reports on New Cement and Concrete Research 33

Method of testing analyzed with stress laid on need for greater uniformity in procedure.

Volume Changes in Hydrated Portland Cement 41

An illustrated paper by Prof. Alfred H. White.

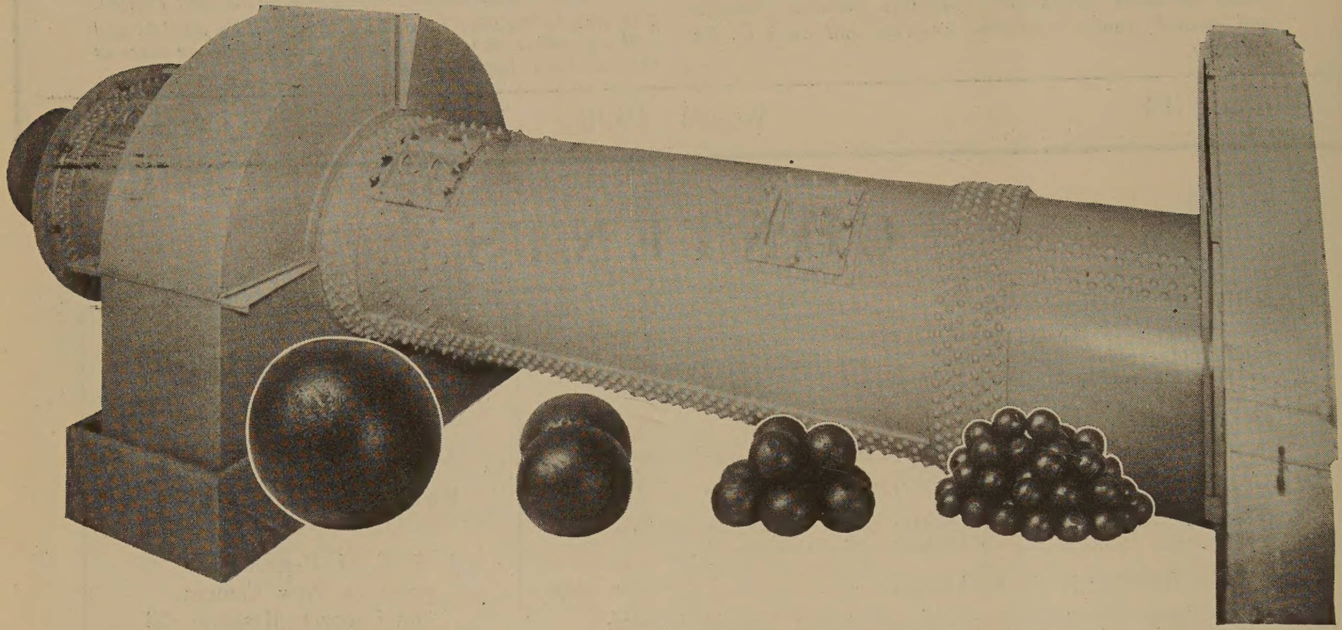
—and several other articles on concrete and the uses of cement of interest to the cement manufacturer.

Copyright, 1928, Concrete Publishing Company

INDEX TO ADVERTISEMENTS

Allis-Chalmers Mfg. Co. 121
Babcock & Wilcox Co. 115
Bradley Pulverizer Co. 129
Burrell Engineering & Const. Co. 128
Caldwell, H. W., & Son Co. 127
Coates Steel Products Co. 92
du Pont de Nemours & Co., Inc., E. I. 116-117
Edge Moor Iron Co. 123
Engineering & Designing 86
Foster Wheeler Corp. 128
Fuller Co., The 119
Fuller Lehigh Co. 124
Haynes Stellite Co. 118
Hunt, Robert W., Co. 86
Huron Industries, Inc. 120
International-Combustion-Engr. Co. 113
Jones Foundry & Machine Co., W. A. 114
Kritzer Co., The 86
Latimer, Robert L., & Co. 112
Link-Belt Co. 122
Meade, Richard K., & Co. 86
Pennsylvania Crusher Co. 126
Polysius Corp. 90
Quigley Furnace Specialties Co., Inc. 129
Schaffer Poidometer Co. 89
Smidth, F. L., Co. 130
Standard Oil Co. (Indiana) 125
Super Cement Co., The 88
Timken Roller Bearing Co., The 12

COATES GRINDING MEDIA



are preferred because of quality, service, and price

We manufacture nothing else but grinding media, and as a natural result we give our best efforts to making our grinding media superior to all others. In this way we have developed a line of grinding bodies that will meet almost any grinding requirement with maximum economy.

Then, too, specialization has made it possible for us to keep our production costs at the minimum, and our prices the lowest consistent with quality. You save money when you buy Coates Grinding Media.

We are prepared to furnish all sizes of grinding balls and slugs as follows:

CARBEX FORGED STEEL BALLS—⅞-in., 1-in., 1¼-in., 1½-in., 2½-in., 3-in., 3½-in., 4-in., 4½-in., 5-in. diameter.

"TUNGSCO" Steel Nuggets—⅝x1 in.; ¾x1¼ in.; ⅞x1¼ in.; 1x1¼ in.; 1⅛x1¼.; 1¼x1⅜ in.

If you will let us know what your grinding requirements are, we shall be glad to submit prices on same. We carry ample stocks and can make prompt shipments.

Coates Steel Products Company

GREENVILLE, ILLINOIS

Largest Manufacturer of Grinding Media Exclusively

Index to Advertisers on Page 91 of This Section

MILL SECTION of

Concrete

Vol. 33 Chicago, August, 1928 No. 2

Viscosities of Slurries

Studies of the Viscosities of Clay Slips and Cement Slurries as an Aid to Operating and Design Economies—Method of Testing Viscosity of Slurries—Relation of Viscosity to Specific Gravity—Charts Showing Results of Tests

By S. E. HUTTON
Chief Engineer, Pacific Coast Cement Co., Seattle, Wash.

AMONG the numerous investigations carried on in connection with the development of the project and the design of the plant of the Pacific Coast Cement Company some of the most interesting have been those having to do with clay slips and cement slurries.

Many problems, such as water requirements, transportation facilities for clay slip, pump sizes, motor sizes and speeds, pipe sizes, slurry storage capacities, and mixing devices, are largely a matter of the percentage of water in slurry, or of the viscosity of the slurry to be handled.

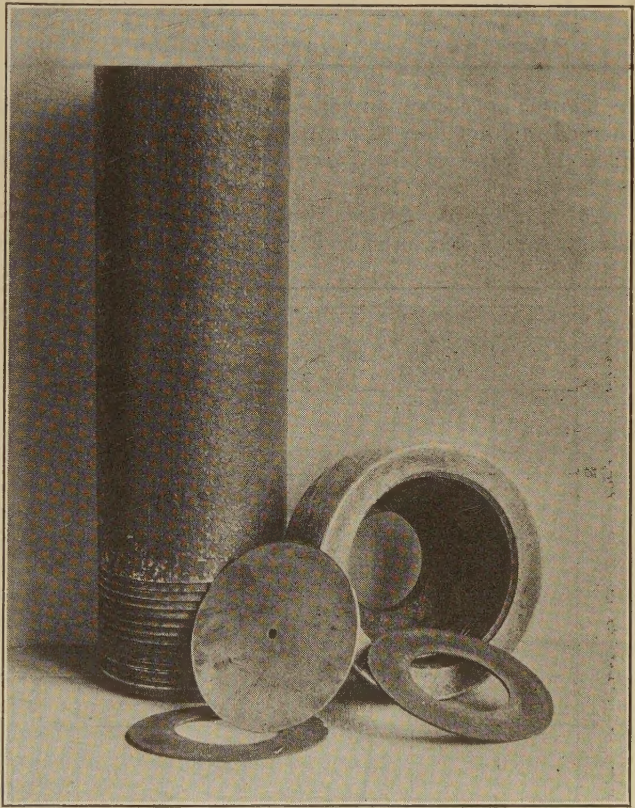
Finding no records of current practice in determining and recording slurry viscosities, we followed the common methods used in testing the viscosities of asphalts and oils. Realizing that we might get useful information from tests made by others, and hoping that we might find practical applications for the device in plant operation, we made up a simple and cheap tester instead of using refined laboratory apparatus.

A piece of standard inch-and-a-half black pipe, with a standard thread on one end, is faced off square on both ends, and is exactly 6 in. long. A standard pipe cap is bored out to about 1 in., which serves to hold gaskets and a diaphragm against the end of the pipe. The diaphragm is of non-rusting metal, copper or brass, two hundredths of an inch thick, and pierced with a hole three thirty-seconds of an inch in diameter. Several diaphragms were made by clamping together several sheets of metal, drilling them with an accurately chucked drill, and rejecting the top and bottom sheets to avoid the effects of burs around the edges of the diaphragm holes. Stainless steel, being harder than brass or copper, would be a better material out of which to make these diaphragms. The viscosimeter, knocked down, is shown in the illustration herewith.

How Viscosity Was Measured

The viscosity of any fluid tested in this device is recorded in terms of the number of seconds required for 100 c.c. of the material, under an initial head of 6 in., to flow through the orifice into a graduated glass. The 6-in. length of pipe, and the bored-out pipe cap, provide the standard 6-in. head, and permit the tip of a finger to be used against the lower face of the diaphragm as controlling valve. Consistent results, sufficiently accurate for the purposes in view, are obtained.

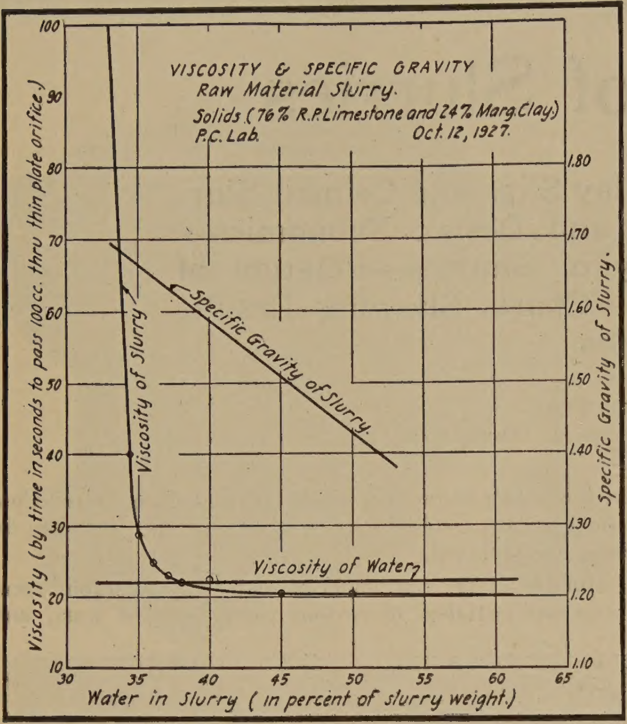
Slurries of the raw material under investigation, accurately proportioned in various percentages of water and solid matter, were run through the viscosimeter. The results were plotted with the time of flow along one axis and with the percentage of water in the sample along the



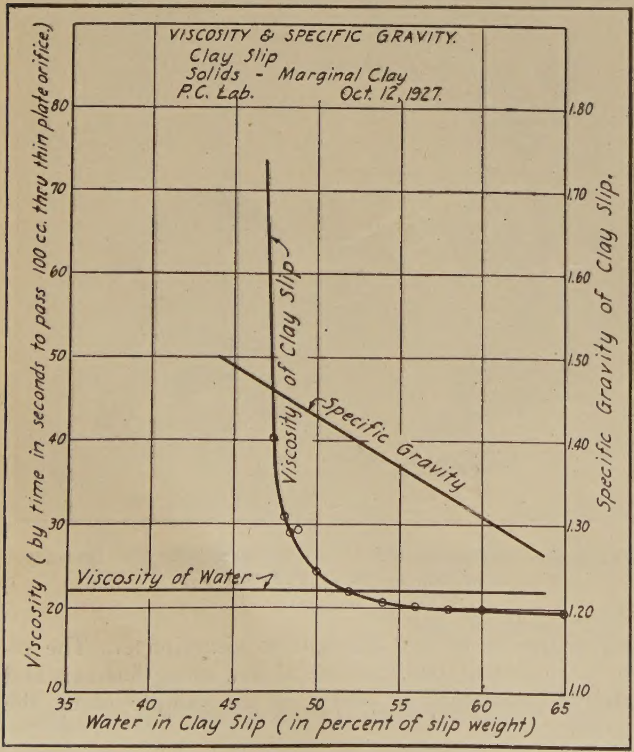
The home-made viscosimeter used to determine the viscosity of cement slurry and clay slip other. A fluidity curve resulted, and, as a matter of interest, specific gravities and the time for the flow of water were also plotted.

Effect of Specific Gravity

Characteristic curves for different materials, clay, rock flour, and cement slurry, were obtained. Typical curves are shown in accompanying illustrations. It is to be observed that not only viscosity, but specific gravity, also, affect the shape of the curve with respect to the line for the rate of water flow.

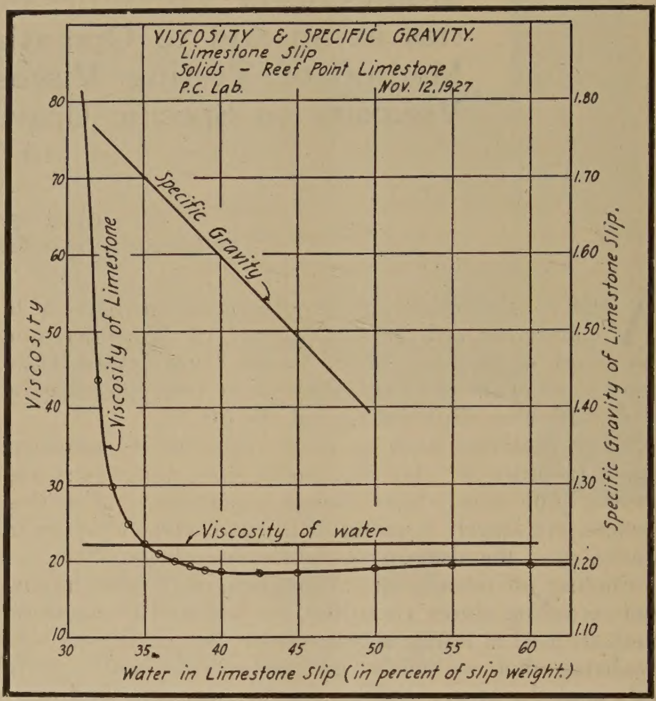


With this simple device, slurries, made of raw materials not previously used, can be compared with slurries actually being handled in various plants, and reasonably intelligent guesses can be made as to storage capacities required, and as to the performance of handling, mixing, and agitating equipment. Information on such topics is not easy to gather, and it cannot be recorded or transmitted without some means of recording the quality of slurries on which all such matters chiefly depend—viscosity.



Our experiments in this line have given us information of great value, and with the co-operation of the manufacturers of slurry handling and mixing equipment we expect to make it even more valuable.

It is conceivable that values may be found for constants in the William and Hazen formula that will make it applicable to the flow of slurries in pipe lines. At least, the performance of a given piece of equipment in one plant would be more significant to the operator of another plant if he knew something of the relative viscosities of the slurries involved.



A. E. S. C. Reorganized and Renamed

The American Standards Association is the new name of what was formerly the American Engineering Standards Committee and is the result of the reconstruction of the organization. The move, according to an announcement, was made to keep pace with the growth of industrial standardization in the United States.

Among the conditions which led to the reorganization are the growth of the trade association movement together with the predominating position which the trade association is coming to have in the field of industrial standardization; and the increasingly important direct part which the plant executive is playing in the standardization activities within his plant and in the movement as a whole. Recognition of this latter condition is reflected in the make-up of the board of directors, which will control the general administrative and financial affairs of the association. The industrial executives composing this board will be elected on nomination of member bodies, and will serve for three years.

Colored Cements in Europe

Some Sources of Coloring Materials Used to Produce Colored Cements—Methods of Manufacture

By E. T. ELLIS, F.J.I.

CEMENT manufacturers in many parts of Europe have successfully marketed colored cements for a number of years. So far as the United States is concerned up to the time of writing it appears that colored cement has not yet been marketed, though obviously many firms are giving the most serious consideration to this important question.

Many attempts have been made to combine the color with the cement during the actual manufacture of the former, but up to now it may be said that these efforts have proved almost entirely unsuccessful. The coloring of the cement is, therefore, a subsidiary process, i. e., portland cement is manufactured in the usual way, and then a suitable coloring agent is mechanically mixed therewith. Although recovery of the pigment from the cement is a difficult matter, cement firms must grasp at the start that only a mechanical mixture is sold, and not a definite chemical combination.

Some Red Cements

A big demand has already sprung up in Europe and elsewhere for red cements, and it will be convenient, therefore, to take these up in the present installment. Red cements do not include the pink varieties, about which I shall speak in a later article, but the shade of red can be varied very considerably according to the proportion of the coloring agent employed. In this and other articles it will not as a rule be convenient to give more than three shades, as experience has shown that these are sufficient to meet almost every ordinary requirement.

Iron Oxide Red

Examination of a large number of coloring agents reveals the fact that several are quite unsuitable for the preparation of red cements. A permanent red is absolutely necessary, i. e., one which will not be changed by oxidation, or other atmospheric influences, nor again be altered by, or alter, the character of the cement itself. The most suitable coloring agent of any and one which gives several desirable shades is found in ferric oxide, otherwise sesquioxide of iron. Cement makers must distinguish this from ferrous oxide and also from magnetic oxide, otherwise quite different results will be obtained. Pure samples are essential, and these are readily prepared.

Unexploited Sources of the Coloring Agent

A very large number of unexploited sources of ferric oxide for use in the manufacture of red colored cements are available, and only a few of these can be dealt with. The following are, however, most readily accessible, and cement manufacturers should, therefore, direct their attention mainly to them:

Tinplate copperas,
Galvanizing copperas,
Hydrogen works copperas,
Spent pyrites of sulphur dioxide factories,
Spent bog ore of gasworks,
Residues of Nordhausen sulphuric acid works, and
Iron turnings from the engineering industries.

It may be mentioned that iron salts are sometimes obtained as by-products in organic chemical operations, and that if these are calcined in the presence of air, iron oxide red is obtained. In those cases, therefore, where cement manufacture is carried on adjacent to organic chemical works, an unexploited source of a valuable coloring agent may be found actually next door.

Manufacturing Methods

Each of the above unexploited sources of coloring agents requires some manipulation, and the main points are briefly summarized below, although, of course, for a detailed discussion treatises on inorganic chemistry should be consulted.

The tinplate copperas is usually heated to redness in retorts or crucibles until it is completely decomposed, care being taken to recover the acid fumes. The red ferric oxide is then finely ground, and at once employed as a coloring agent.

The galvanizing copperas often contains some acid, and the introduction of scrap iron into a solution of this is desirable, in order to neutralize it. The copperas is then crystallized out again, and heated in retorts to redness, a lower temperature giving a duller color. Acid fumes are again evolved, and these are collected. The ferric oxide is subsequently ground, and is then available for use.

Hydrogen works copperas often contains a quantity of carbonaceous material. A solution of it should be made, and this filtered. If the solution is strongly acid the introduction of a ferrous carbonate or even scrap iron is necessary, to neutralize it, and the copperas is then obtained by evaporation, and subsequently calcined at bright red heat in order to decompose it. It is then finely ground and is ready for use.

Spent pyrites, although it is regarded as having had all its sulphur taken from it, frequently contains undecomposed pyrites and other impurities. It should first of all be roasted in the presence of air, in order to set free any sulphur, but moisture should be absent, as otherwise some ferrous sulphate may be formed. The roasted refuse is then heated to bright redness in crucibles or retorts, after which the pigment is well washed, dried, and finely ground.

The spent bog ore refuse from gas purification is often very complex in composition, and sometimes contains as much as 50 per cent of its own weight of elemental sulphur. This can be got rid of by treatment with carbon bisulphide or some other sulphur solvent, and after gently heating to drive off the remains of the solvent, roasting in the presence of air is generally desirable, in order to oxidize some of the impurities. When this has taken place, the color is not generally sufficiently developed, and subsequent heating to bright redness in suitable retorts or crucibles is then arranged for, and this is followed by the usual grinding and sifting operations.

Firms engaged in the manufacture of Nordhausen, otherwise fuming sulphuric acid, have an iron-containing residue which generally consists of a mixture of ferrous and ferric oxides along with some undecomposed ferric sulphate. The last mentioned chemical can be extracted therefrom by the action of water, and the ferrous oxide can be dealt with by roasting in the presence of air. The color of the pigment is then developed by raising its temperature in retorts or crucibles to bright red heat, and after slow cooling the ferric oxide is finely ground.

The filings and turnings of iron produced by many engineering works can be transformed into iron oxide red for use in cement manufacture in a great variety of ways. The simplest is, of course, to treat them with sulphuric acid, and to filter off insoluble matter, which as a rule contains some low grade ferric oxide. This liquid is then introduced into multiple evaporators, and the copperas taken therefrom as it crystallizes out. Such copperas is then calcined, and ground in the same manner as that mentioned under tinplate copperas.

Having obtained the coloring agent it remains to mix it with the cement. This can be done in the cinder state of the latter, but it is more usual to grind the cement to the required fineness first, then to grind the coloring agent to the required fineness, and subsequently to mix the two together, first of all in mechanical stirrers, and subsequently to regrind the mixture before finally bagging or barrelling.

Proper Proportions

With regard to the proportion of coloring agent which can safely be mixed with cement, this in the case of iron red is subject to very wide variation owing to the chemical inertness of ferric oxide. Cements containing small proportions of coloring agents are obviously more economical than those containing large quantities, or to put it another way, in the case of a very deeply colored cement considerably more has to be used to secure a satisfactory set, owing to the large amount of pigment which is present. In view of the fact that colored cements sell at a considerably enhanced price this is a matter of some importance, but in view of the cheapness of the iron oxide red pigment employed, firms will not find that they have to sell colored cements containing it at a close market figure. The attractiveness of a red colored cement is undeniable, and this fact should be pushed for all it is worth when selling it.

Suitable proportions for three shades of red cement are given below:

Pale Red Cement

Cement	930 parts
Ferric oxide	70 parts

Mix dry and incorporate the two very thoroughly.

Medium Red Cement

This is one of the best formulas for general use:

Cement	860 parts
Ferric oxide	140 parts

Mix very thoroughly, with both the cement and the oxide in a perfectly dry condition.

Dark Red Cement

The color of this is magnificent, but it is rather an extravagant mixture to use, as about 25 per cent more than uncolored cement has to be employed to insure a satisfactory set.

Cement	790 parts
Ferric oxide	210 parts

See that the ferric oxide is perfectly dry and free from ferrous oxide before mixing it in.

New Tennessee Plant

This is a late view of the new plant of the Volunteer Portland Cement Company located at Knoxville, Tennessee, and described in detail in the May issue of CONCRETE. It has just recently gone into operation. The anticipated production of a million barrels annually will be handled by a force of 115 men.

June, 1928, Makes Safety History

Reduction in Lost-Time Accidents Amounts to 17 Per Cent Over June, 1927—One-Quarter as Many as in Same Month of 1926—Report of Regional Meeting for Ohio, Pennsylvania and West Virginia Held in July—Some Individual Plant Activities

A SEVENTEEN per cent reduction in the number of lost-time accidents over that of June, 1927, was one of the results attained in the June, 1928, no-accident campaign of the Portland Cement Association. There were 49 lost-time accidents and one fatality. For a similar period last year 59 accidents were reported and one fatality. During June, 1926, 198 lost-time accidents were suffered by the industry, with six fatalities.

Added importance is given to these figures due to the fact that more men were employed and 17 more mills were in operation. Twenty per cent less accidents were recorded with 11 per cent more mills reporting. While 145 plants reported last year, 124 had no accidents, 162 reported this year and 137 were accident-free.

From these figures it is seen that in general the plants improved on their work the past June but did not quite attain the high record sought. In fact, three plants alone contributed 19 accidents, one with 8, another with 6 and the third with five.

Accidents were grouped as follows, by departments:

Quarries, mines and clay fields	10
Raw end	2
Burning	6
Finishing	6
Cement storage	2
Coal grinding	3
Power	1
Shops	2
Packing and shipping	3
Yards	1
Unclassified at present	13
Total	49

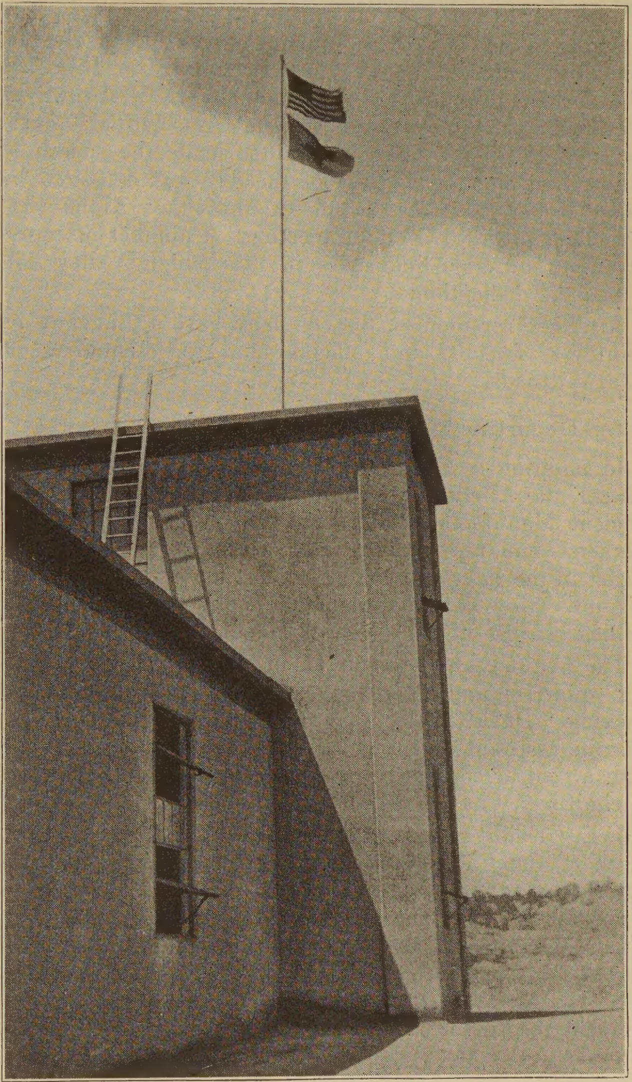
Eastern Regional Meeting

Safety plans for the next year and methods of further reducing accidents in cement mills were discussed at a meeting of operating officials of Ohio, western Pennsylvania and West Virginia cement plants on Tuesday, July 10th, at Pittsburgh, Pa.

The meeting was called to order by E. D. Barry, superintendent of the Universal Portland Cement Company. Representatives of the two mills in the district winning Portland Cement Association trophies for safe operation 1927 spoke at the morning session. "How We Won the Association Trophy" was the subject of a talk by Wesley Davy, chief engineer for and representing the Lehigh Portland Cement Company. W. W. Hamilton, chief engineer of the Alpha Portland Cement Company plant at Ironton, Ohio, represented that plant and gave a short talk.

Francis Feehan, safety commissioner of the U. S. Bureau of Mines, acted as luncheon chairman. Speakers included G. H. McClain, safety director of the south plant of Jones & Laughlin Steel Co., Pittsburgh, and J. P. Annin, New York, who spoke on "Foreign Competition."

The afternoon session was presided over by Robert Parsons, superintendent, Pittsburgh Plate Glass Co. Discussions of safety work by departments occupied this session. The first, on safety work in quarries, was led by C. H. Bolyard, chief engineer of the Alpha plant at Manheim; that in crushing departments, by V. R. Diefenderfer, superintendent of the Wellston plant; on raw mills, by W. P. Rice, Crescent company superintendent; in burning departments, by A. C. Hiscox, superintendent of the West Penn Company plant, in finishing mills and coal grinding departments, by A. J. Little, superintendent of the Bay



Long may it wave! The safety banner of the Colorado Portland Cement Company, near Ft. Collins, afloat in the breeze. This was one of the plants having a no-accident record in the June campaign

Bridge Sandusky plant, in power departments, by J. B. Zook, chief engineer of the Great Lakes plant, and in the packing and shipping departments and yards, by J. R. Cline, assistant superintendent with the Universal company. The next address was by A. J. Eales, safety director of the Bessemer Cement Corporation, who spoke on "Taking Mill Safety Work to the Community."

One-hundred and four persons, representing the following plants, attended the gathering: The Alpha Company plants at Ironton, Ohio, and Manheim, West Virginia; Plastic Products Company, Kenova, West Virginia.; Bessemer Cement Corp., Buffalo; Crescent, Wampum, Pa.; Diamond, Middle Branch, Ohio; Great Lakes, Buffalo; Lehigh, New Castle, Pa.; Pittsburgh Plate Glass, Zanesville, Ohio; Sandusky, Bay Bridge, and Toledo, Ohio, Standard, Plainesville, Ohio; Universal, Pittsburgh; Wellston Iron Furnace Co., West Penn, Ohio. and West Penn Cement Co., West Winfield, Pa.

Safety Trophy Dedication

Alpha plant No. 3 at Martins Creek, Pennsylvania, formally dedicated its 1927 safety trophy on July 7th. The formal presentation was made by G. S. Brown as president of the Portland Cement Association. Moses Evert of the plant safety committee made the speech of acceptance, and the address of the day was delivered by Judge Robert A. Stotz. Frank G. McKelvey, Alpha vice-president, presided over the meeting. A number of representatives of other industries in the Lehigh Valley witnessed the dedication.

After the ceremonies, the company gave a dinner to its employes, friends, and officials and representatives of local railroads.

Inter-Department Contest

In addition to the Portland Cement Association safety banner, the Allentown, Pennsylvania, plant of the Coplay Cement Manufacturing Company is flying five separate banners—one representing each group of the plant engaged in the inter-department contest under way. At time of publication no department had been obliged to lower its flag because of a lost-time accident.

The five departments entered in the contest are operating, quarries and railroads, electrical, mechanical, and packing. David Uhle, operating manager, and J. V. Durnin, assistant operating manager, are in general charge with a central committee composed of James Vandergrift as chairman, Chas. Haas and W. F. Nagle.

J. E. Griffith, superintendent of the Portland, Colorado, plant of the Colorado Portland Cement Company, in a letter to CONCRETE, says: "I am enclosing a couple of snaps of our campaign flag for our "June No Accident Month Campaign." Also a couple of verses I wrote and posted on our bulletin board early Sunday morning, July 1st, after we had completed the month with a no accident record for June.

The fruit of Mr. Griffith's creative mood follows:

"SAFETY FIRST AND ALWAYS"

"Oh, say can you see
By the Dawn's early light
How so proudly our flag
O'er our plant it still waves."

"So, let us not stop
Without caution or care
But keep it in sight
'Til its threads are all bare."

Below are presented the "safe songs" prepared by the Portland Cement Association for regional safety meetings.

GET ACQUAINTED

(Tune: Tipperary)
It's a good time to get acquainted,
It's a good time to know
All the hustlers and all the live ones
That are here to make things go.
Good-bye, chilly shoulder,
Good-bye, glassy stare,
When we all join hands and pull together,
We're sure to get there.

HI HO THE MERRY O

I wake up each morning, singing merrily,
Hi Ho the Merry O!
Hurray for saf-e-ty!
I can laugh at troubles, I'm as happy as can be.
Hi Ho the Merry O,
Hurray for saf-e-ty!

Just like the rooster, I keep crowin',
Today we're starting something we'll keep goin'!
Throw out all the careless,
Ship them C. O. D.
Hi Ho the Merry O,
Hurray for saf-e-ty!

GET TOGETHER

(Tune: Ach, Der Lieber Augustine)
The more we get together
Get together, get together;
The more we get together,
The happier we'll be.
For your friends are my friends
And my friends are your friends;
The more we get together,
The happier we will be.

JINGLE BELLS

Blow that horn, blow that horn,
Jump upon the gas,
Oh, what red hot fun it is,
Another car to pass:
Roaring down a concrete road,
The surface sure and fine,
Give her all that's comin', kid,
We're touching eighty-nine.

Ninety-five, the meter says;
The speed laws all are hash.
Holy sweet patootie,
But we're headed for a crash.
Toll, Oh, Bells; Toll, Oh, Bells,
Keep tolling all the day,
For another sorry dumbbell's busy
being laid away.

SMILES

There are smiles in old Kentucky,
There are smiles in Idaho;
And you'll find them down in dear old Georgia,
And in every part of O-h-i-o.
There are miles of smiles in Minnesota
And in Michigan and Tennessee:
BUT THE SMILES THAT FOLLOW SAFE PERFORMANCE
ARE THE SMILES THAT LOOK BEST TO ME.

THE ACCIDENT LIST

(Tune: The Old Grey Mare)
The accident list, it ain't what it used to be,
Ain't what it used to be, ain't what it used to be;
The accident list, it ain't what it used to be
Many long years ago.

Many long years ago, many long years ago.
The accident list, it ain't what it used to be,
Ain't what it used to be, ain't what it used to be;
The accident list, it ain't what it used to be
Many long years ago.

Large Scale Blasting in South Australia

Detailed Description of a Large Blast in the Limestone Quarries of the Adelaide Cement Company

A LARGE scale blasting operation was recently conducted in South Australia; it is also, as far as is known, the first occasion in which detonating fuse has been used in that state, and the following description, given in the Review of the South Australian Department of Mines, will be found of interest.

The treatment works of the Adelaide Cement Company are situated at Birkenhead, near Port Adelaide, but the supplies of limestone used in the manufacture of cement are drawn from extensive quarries controlled by the company, at Klein Point, near Stansbury, Yorke Peninsula.

A well hole boring plant, driven by gasoline and capable of boring a 5½-in. diameter hole the full depth of the face, is in use for the primary blasting, and compressed air drills of the jackhammer type are used for the secondary boring. Quarrying operations are conducted on coastal cliffs of shell limestone, a polyzoal limestone of Janjukian age, having an average height of 60 ft., the face being now over 1,000 ft. in length, and 300 ft. back from the water's edge. The limestone varies in quality in the quarry face, there being soft, less consolidated bands alternating with harder and denser layers of different lime content, and it was found that the bench method of quarrying was not best suited to give a uniform mixture. For this reason, amongst others, it was decided to blast the full face down in one operation.

With a well hole drill a single row of 19 holes was drilled the full depth. A careful log of the bores was kept, noting any features which might affect the charging or blasting. As sectional loading was to be adopted, and for general reasons of safety and simplicity, it was decided to use detonating fuse—the Bickford Cordeau detonating fuse consisting of lead tubing slightly less than ¼-in. in diameter, and filled with tri-nitrotoluene (T. N. T.), size No. 6 being used.

The loading and tamping of the holes, 19 in number, was begun on one day and completed on the following. Special cartridges 26 in. long and 5 in. in diameter, weighing 25 lbs. were mainly used, these cartridges being provided with a central cord to form a loop for lowering purposes, and a copper hook, designed by the manager, was used for lowering the heavy plugs, a light line from the lower portion of the hook enabling this to be released from the loop of the cartridge when required. A small quantity of ordinary sized plugs of explosive was used in some of the holes. The Cordeau or detonating fuse was inserted into the lower end of the first cartridge lowered, and was thus carried to the bottom of the hole, the requisite amount of explosives and tamping being then placed in the holes where required.

When the loading process was completed, a main line of Cordeau was unreeled across and extended beyond the tops of the holes and the fuse projecting from each hole was connected with it by splitting each projecting fuse in the center and placing the main line in the crotch of the split. The two halves were then twisted firmly about the main line in opposite directions. At each side of the surface main line of Cordeau an electrical No. 6 detonator was clipped and connected to the electrical firing circuit, there being thus only two ordinary detonators used in firing the 19 holes. The current for firing these was taken from a power circuit, the firing switch being enclosed in a locked box.

5,900 Lbs. of Explosives Used

The total amount of explosives used was 5,900 lbs., of which 5,000 lbs. consisted of 50 per cent gelignite, mainly in large cartridges; and 900 lbs. consisted of 60 per cent gelignite in small plugs. The actual drilling time for the 19 holes, totaling 1,145½ ft., was 415 hours, an average rate of 1 ft. in 21¾ minutes. The operators, being unused to this method of drilling, were somewhat slow at first, and some mechanical delays also occurred, but the rate of progress improved with practice, and the last hole, 50 ft. deep, was bored in 11 hours, or 13 1/5 minutes per ft.

The deepest hole was 70 ft., the shallowest 49 ft., the average being 60.2 ft., and the holes were drilled only to quarry floor level, it being considered that the comparatively soft ground at that level would yield sufficiently to the blast without boring below the level. The average burden of ground on each hole was 28 ft., and the average spacing was 20.8 ft. The actual explosion took place without undue disturbance, the whole length of face lifted out and settled down uniformly, and no stones were projected any distance and as far as could be seen it was entirely successful.

Some of the masses of rock thrown down were, however, of large size, and a considerable amount of secondary blasting will be required, indicating that the use of more explosives in the primary blast would be advantageous in securing a better shattering effect. From measurements taken before and after blasting it was found that the shots had broken back on an average 15 ft. into the solid ground behind the holes. Behind this again large vertical fissures had developed, parallel to the face, so that it seems reasonable to suppose that the break 15 ft. back reached the floor level. Assuming this to be the case, the total volume of broken ground would be 60 ft. in depth and 43 ft. in width, with a length of 399 ft., allowing an extension of 12 ft. beyond the end holes; this would give a total of 1,029,420 cu. ft., equivalent to about 60,000 tons, showing a production of about 10.2 tons per pound of explosive.

The exact figures for the tonnage broken and the total amount of explosives will not be known till the pile has been cleaned up, the secondary blasting adding to the total of explosives used.

New Company to Produce Cement in French African Colonies

French capitalists are organizing a new cement producing company, Societe des Chaux et Ciments du Senegal, with headquarters at Dakar, Senegal, to produce cement, lime and other mineral and stone products in Senegal and the other colonies of France in Africa. The new firm is capitalized at 5,000,000 francs and will maintain an office in Paris.

Kentucky Cities Quick to Bid for Proposed Plant

Up to the present time thirty-eight Kentucky cities and towns have evinced interest in the new cement plant to be backed by outside capital and erected at the most advantageous location within the state. A corp of engineers recently spent several days investigating possible sites, but whether a decision has been reached is not known. An unauthenticated report states that Limeville, near Greenup, has been chosen as the location.

C. Frank Dunn, secretary of the Progress Commission, which is helping to find a location, was recently visited by a representative of a group of cement firms who sought to discourage the plant.

Under the terms of the contract made by the state with the men who will build the plant, the state will buy 75 per cent of its production at 8 1/3 cents less per barrel than the price existing in neighboring states, in the first two years. The backers of the proposed plant are Leigh Hunt, Kansas City, and F. B. Drew, McAlester, Okla.

Install First Machinery in Seattle Plant

Satisfactory progress in all directions is reported by the Pacific Coast Cement Company on its plant at Seattle, Wash. A large part of the cement-making machinery, being furnished by the Traylor Engineering and Manufacturing Company, has been received and much of the concrete work, including kiln piers, is already in.

The clinker storage building contract, calling for the fabricating and erecting of steel, has been let to the Wallace Bridge and Structural Company, a Seattle firm. The Rust Engineering Company has begun work on a uniformly tapered reinforced concrete chimney 200 ft. high. A Cottrell precipitation plant is well along in the process of design. It will be installed by the Western Precipitation Company.

Work on the plant wharf began late in June by the Colby Steel and Engineering Company of Seattle. It is to be about 75 by 400 ft. and will carry a heavy hammerhead crane to be used in unloading ships and handling limestone. Progress is also being made at the Alaskan quarry.

The *Eastern Coast* and the *Eastern Guide*, two ships of 6,300 tons capacity each, have been purchased from the United States Shipping Board by the Pacific Coast Steamship Company. After proper alterations the ships will be placed in service transporting crushed limerock from Dall Island, Alaska, to the new cement mill at Seattle. The service will start about September 1st.

The Pacific Coast Cement Company, in this connection, during May stimulated public interest in its activities by offering a sixteen-day trip to Alaska gratis to the person submitting the two names selected for its two steamships.

Keystone Common Stock Sold to Philadelphia Capitalist

John Barnes, Philadelphia capitalist, has purchased a majority of the common stock of the Keystone Portland Cement Company, whose new plant near Bath, Pennsylvania, is being completed. He has announced his intention, also, of purchasing the balance of the entire issue of common stock at the same price of $25 a share.

The completion of this deal would mean the investment of about $1,000,000. No change has been effected in the ownership of the preferred stock.

Under the new proprietorship, Mr. Barnes becomes president of the company succeeding John Butland, of Allentown. Fred Franks, of Bath, remains as general manager. A new board of directors will be elected.

Announcement has been made that the Keystone plant will be enlarged immediately by the erection of three additional kilns and that further expansion will follow in a short time.

New Corporation Projects Cement Plant in Texas

J. H. Smith, J. W. Young, W. M. Thornton, and associates have formed a corporation for the construction of a cement plant to be located 8 miles from San Antonio, Texas, between the M. K. & T. Rwy. and the M. P. Lines. The plant has been designed, all machinery purchased and construction of buildings and foundations will start the first week in August. The wet process of manufacture will be followed and the plant will have an initial capacity of one million barrels per year. Further details will be available within a few weeks.

Newaygo Plant at Charlevoix to Cost $1,500,000

The project of a new cement manufacturing plant at Charlevoix, Michigan, to be built by the Newaygo Portland Cement Company, is apparently proceeding to a successful realization. J. B. John, while visiting at that place recently, disclosed plans to be developed, stating that the plant will cost approximately $1,500,000. Construction, he said, would be under way within a few months. A channel to cost approximately $50,000 will be dredged from Lake Michigan to the plant. Boats will be loaded and unloaded by the blower system.

For a number of years the locating of a plant at, or near, Charlevoix has been a matter of speculation, widely discussed, but never previously realized.

Bessemer Interests Acquire Peerless-Egyptian

A substantial interest in the Peerless-Egyptian Cement Company, operating three Michigan cement plants having an aggregate capacity of over three million barrels, has been acquired by the Bessemer Securities Corporation, Youngstown, Ohio. L. A. Beeghly, head of the latter, has been named chairman of the newly acquired business. The plants are located at Port Huron, Detroit and Union City.

The Bessesmer Securities Corporation owns control also of the Federal Portland Cement Company, Buffalo, and the Bessemer Limestone and Cement Company, each having a capacity of about 1,500,000 barrels.

French Merger Involves Lafarge and Boyer Interests

An important French cement manufacturer acquired additional interests recently when the Societe Anonyme des Chaux et Ciments de Lafarge et du Teil completed negotiations to secure control of the Societe des Chaux et Ciments Romain Boyer.

All stock of the Boyer company has been acquired by the Lafarge interests and the combined business will be carried on under the name of the Lafarge firm. The capital has been increased from 18,253,600 to 19,303,500 francs.

EDITORIAL

A Buyers' Market

IT does not seem so long ago that the selling of cement was largely a matter of letting this buyer or that buyer have so much cement in response to his request. It was a true sellers' market.

Today the procedure is completely reversed. We are, in common with all other industry, in a buyers' market. The buyer chooses the product he buys from a group of products. His is the initiative.

Is it not due to this fundamental fact—that the buyer takes the initiative—that there has developed the differentiation in types of cement now offered to the buyer? With the buyer choosing as he does today, he has become more critical. He is looking at the matter entirely from his standpoint. When he finds a cement that seems to meet his specialized needs more completely than another cement, it is his privilege to choose it. He takes the initiative. Under such conditions he can even go a step further and cause to be manufactured the kind of cement he desires.

Indications are that the present buyers' market is permanent. In his address before the Detroit convention of the International Advertising Association, Dr. Hollis Godfrey, president of the Engineering Economics Association, tells why he believes this to be true. These are his reasons:

1—"The rate of growth of population is diminishing in the United States. This makes for buyer initiative for there are fewer people to buy the product.

2—"The rate of growth of men and women educated in the high schools is rapidly advancing. This makes for buyer initiative for the intelligent and understanding buyer refuses to accept a condition thrust upon him by a seller.

3—"The bases of growth of material wealth are rapidly advancing. No limit has been found to the productive capacities of the United States under modern methods of production. This makes for buyer initiative, as it presents the buyer with quantities of goods not only sufficient for his needs, but constantly advancing into the field of his wants."

While the reasons quoted above apply to all industry, it is not difficult to translate them into the specific terms of the cement industry.

First, we know that no phenomenal increase in the volume of construction (and therefore in the use of cement) can be expected. Increase in volume of construction under normal condition must roughly follow increase in population. Any "boom" in construction due to artificial stimulation, must be followed by a corresponding slump.

Second, there has been evident an unusual interest in technical knowledge regarding the chemical and physical properties of cements and their relation to the users' problems. The subject matter covered in the programs of the technical societies is evidence enough of this fact. As a result, the buyer is more critical and "choosey." He demands to know how and why this particular cement will meet his needs best.

Third, the production capacity of the cement industry is increasing more rapidly than the demand. Better machinery and more efficient operating are increasing the capacities of existing plants and in addition, new plants are coming into production each year and old plants are being enlarged. Still more new plants are being proposed and are being completed. The industry is capable of more than supplying the buyers' needs.

Because of these facts, the cement industry is facing problems that did not confront it several years ago. They are vital problems that must be solved. It is useless to hope that conditions will change and that there will again be a change to a sellers' market.

Conditions such as these bring new responsibilities with them. More than ever before, it is necessary for the manufacturer to take the buyer into his confidence. If he knows definitely what the industry is doing or is hoping to do to meet his demands, he will be more tolerant of what he considers the industry's shortcomings.

The buyer will no longer be told that cement manufacturing problems are not his concern. He is in a position to make them his concern and is doing so. Already he is probing into the questions of the relations of various chemical and physical properties of cement to its performance in concrete and in the placing of concrete.

Only a relatively small amount of data are available on these subjects. More must and will be secured. It is the manufacturers' duty as well as his opportunity to secure this information and to pass it on to the user, rather than to let the user take the initiative in this matter also.

Sales policies, advertising copy, type of product—all must be adjusted to the fact that a buyers' market prevails. The matter of the new cements is a direct outcome of these conditions and must be met in accordance with them. New sales methods are called for and a new type of advertising copy is needed to appeal to buyers who are choosing critically.

◆

Complete Reorganization of Riverside Portland

In order to retire funded debtedness and provide a more adequate capital structure, the Riverside Portland Cement, a California corporation, has been reorganized as the Riverside Cement Company, a Delaware corporation. Under the reorganization plan, three classes of stock will be issued in place of the 60,000 shares of capital stock now outstanding. The new capitalization will consist of 70,000 shares of $6 cumulative no-par first preferred stock, 65,000 shares of which will be presently outstanding; 240,000 shares of Class A, $1.25 no par cumulative participating stock authorized and to be issued and 400,000 shares of Class B no-par common of which 345,000 shares will be issued.

For each share of old stock, shareholders will be entitled to receive one share of preferred and four of Class A stock. The funded debt to be retired amounts to $375,000.

Net assets of the company are in excess of $10,000,000, and net earnings for the past six years have averaged $1,500,000.

European Cement Producers Favor Formation of Trust

Polish manufacturers of cement are looking forward to a great increase in their annual exports, following a conference in Warsaw of cement producers from Germany, Finland, Esthonia, Belgium, Poland and Denmark, at which plans for a European cartel, or trust, were outlined.

While no trust was formed, the immediate result of the conference was the appointment of a commission to study the project of joint exports between the countries attending the conference. This commission is now pursuing its investigations and a report is expected to be ready shortly.

It is believed by the cement makers of Poland that a cartel is necessary, preferably one along the lines of the existing agreement between Sweden, Norway, Denmark, and Finland. However, the commission is devoting its efforts to the establishment of a cartel which will embrace all European countries which produce cement.

Publication of Active List of Permissible Explosives

Arrangements have been completed for the systematic publication of the "Active List of Permissible Explosives" and of all changes taking place in that list upon authorization of the director of the United States Bureau of Mines, Department of Commerce. Such lists are to appear as Bureau of Mines "Reports of Investigations." The complete "Active List" of that date is to appear annually on the first secular day of July. Any changes authorized, subsequently, in that list are to be published on the first secular day of the month following their authorization. These changes may be due to additions of explosives to the list or to withdrawals or removal of explosives from it; to transfers of explosives from the active to the inactive list, or the reverse; to changes in brand names; changes in the name of the manufacturer; changes in the smallest permissible diameter; changes in classification; declarations of the identity of explosives appearing under different brand names; and the like.

The last published "Active List of Permissible Explosives" appeared as Serial 2818, July, 1927. The addition of four explosives to that list, with the names and characteristic data given for each of the four explosives, was announced in Serial 2854, February, 1928.

The newly approved system was inaugurated with Serial 2864, April, 1928, in which the names were given of nine different permissible explosives that had been transferred, during March, from the active to the inactive list.

From past experience during the 19 years since the list of permissible explosives was first established it is to be expected that there will occur months in which no changes of any kind will be authorized for permissible explosives, and that, therefore, no reports of investigations on this subject will be issued for the succeeding month.

The Bureau of Mines publication, "Consumption of Explosives," is issued each month and there will appear in each of its issues a note setting forth the state of publication of the active list of permissible explosives.

Industrial Coal Stocks Show Continued Decline

Coal stocks in United States industries on June 1st continued their downward trend, showing a further decline of 2,640,000 tons from May 1st, according to the National Association of Purchasing Agents.

Consumption stayed about the same, total consumption being slightly less than 35 million tons, making the number of days' supply of coal on hand 36 days. On June 1st of last year the country had on hand 54 days' supply of coal, total stocks being 65½ million tons. Consumption as of June 1st last year was 8½ per cent greater than this year. Two years ago total stocks on hand were 36 million tons or 10 per cent lower than at the present time. Number of days on hand was 31. Thus our present stocks are within 10 per cent or four million tons of a normal year and the consumption is running just about the same as consumption in 1926.

Bituminous production showed an increase of 4½ million tons during May as compared with April, largely due to increased coal shipments up the lakes and also due slightly to the increased exports which jumped from 800,000 net tons of bituminous coal to 1,290,000 net tons.

Polish Cement Production Shows Increase of 45 Per Cent

Polish production of cement in 1927 is reported to have shown an increase of almost 50 per cent over the 1926 figure. Production in 1927 amounted to 809,000 tons and in 1926 to 557,000. Export trade increased to 151,696 tons in 1927, from 41,120 tons in 1926.

Notwithstanding these increases, the industry is working at only slightly over 50 per cent of its total capacity of 1,400,000 tons. A central sales bureau has been established, controlling both domestic and foreign sales, to prevent overproduction.

These figures are furnished by the American Polish Chamber of Commerce and Industry in the United States.

Addition Under Way to Double Capacity of Oregon Plant

The present 1200 barrel per day capacity of the Oregon Portland Cement Company plant at Lime, Oregon, will be doubled when the second unit, now being added, is completed. The finishing mill and two new packing machines will be the first of the new machinery to be installed.

The rock crushing plant, tramway and storage bins, when constructed four years ago, were built of a sufficiently large capacity to care for the second unit, under way.

The Chemistry of High Early Strength Cements

The Importance of Chemical Control on the Quality of Portland Cement, Especially on Early Hardening—Relation of Hydraulic Factors to Early Hardening—Velo Cement—Bauxitland Cement—Fluxes—Effect of Chlorine Compounds on Rate of Hardening

By DR. HANS KUEHL

(Concluded from the July issue)

The fact that portland cement clinker will harden better when certain accelerating substances are present in the mix is well known through practical experience, at least insofar as the action of calcium sulphate is concerned. Although calcium sulphate (gypsum) was originally added to the cement mixture for the purpose of regulating the time of setting, nevertheless every cement man knows that a certain increase in the strength of the cement is also attained when calcium sulphate is added. Likewise, other compounds of calcium, and particularly calcium chloride, have a similar action on the cement. Developments that have taken place during the previous year in the cement industry have led to the practice of making widespread use of this property of calcium chloride in the manufacture of special cements. The increase in the strength of the cement which can be brought about by the use of calcium chloride is considerably greater than that which is obtained when calcium sulphate is added. It is unfortunate that calcium chloride combines with its strength-increasing characteristic the property of shortening the setting time when the salt is used in those concentrations which I have been experimenting with and which have been used for obtaining the other effect. The result is that any increase in the amount of calcium chloride added to the mix must be made with due consideration of the effect of the calcium chloride on the setting time. There is a limit beyond which it is not safe to go.

I have been trying for a long time to find a substance which could be added to the mix whose action is similar to that of calcium chloride in increasing the rate of hardening, but which will not affect the setting time. Inasmuch as it is apparent that chlorine is the element which causes the increase in the strength of cement, I carried out a number of experiments with the intent of incorporating chlorine in such form with the cement that its action as chlorine ion may be manifested only after a certain period of time has elapsed. Hence, I have added, for example, in the place of calcium chloride, a mixture of chloride of lime and calcium sulphide to the cement. For I said to myself that gypsum—calcium sulphate—and calcium must ultimately be formed from the chloride of lime and calcium sulphide through the mutual oxidation and reduction that take place. The expected increase in the strength of the cement took place, but the undesirable acceleration of the time of setting also occurred. I concluded from these experiments that the transformation between the two added components took place much quicker than I had expected. Although the results of the experiment practically never attained any practical importance, I nevertheless incorporated with the cement various substances which contained chlorine in the molecule, for theoretical reasons only. Thus I used chloroform, carbon tetrachloride, trichloroacetic acid, chloral hydrate, and still other forms of chlorine in combined form. It was regularly found that the chlorine compounds were saponified by the alkaline action of the cement mixed with them and the expected increase in strength resulted. Nevertheless, in certain instances the saponification proceeded so slowly that the odor of the added substances was noticeable for a long time after they had been incorporated with the cement, while in other instances the saponification was so rapid that the time of setting considerably shortened. I will not go into details, but will hold back whatever information I have available now until such time when I can publish the complete results of these investigations.

Other Chlorides and Nitrates

In order to obtain some idea as to which inorganic substances could be used for increasing the early strength of portland cements, I conducted some experiments during which I dissolved many of the known inorganic substances in the water used to make the cement paste, and thus observed their action on the cements themselves. I continued these tests until I added to the cement an entire series of salts, of which the cathion was changed in the first series of experiments and the anion from experiment to experiment in the second series of experiments.

In the cathion series I used the chlorine compounds, for the reason that I started the investigation from the known action of the salt, calcium chloride, on the cement. Then in place of 2 per cent of calcium chloride I used numerous other chlorides in equimolecular proportions. In certain instances, where the chlorides were not easily soluble in water, particularly in the case of lead chloride, I used the nitrates in place of the chlorides. The chlorides, or in certain instances the nitrates, of the following metals were employed in this manner: lithium, sodium, potassium, ammonium, magnesium, calcium, strontium, barium, zinc, cadmium, aluminum, chromium, iron, manganese, nickel, cobalt, tin, lead, and copper. The action of all these chlorides varies considerably, and the following sketchy observations are recorded with respect to the essential characteristics of the behavior of these chlorides and nitrates.

Those that have a definite effect in increasing the strength of the cement are the chlorides of the following metals: lithium, sodium, potassium, ammonium, calcium, strontium, barium, cadmium, aluminum, and iron (ferric).

An address at the Fifty-First Meeting of the Association of Gorman Portland Cement Manufacturers and translated from *Zement.*

[1] *Wochenschrift fuer oeffentlichen Baudienst,* 1915, No. 41.

Those that do not affect the strength of the cement are the chlorides of the following metals: magnesium, chromium, iron chloride (ferrous), nickel, and cobalt.

Those which reduce the strength of the cement are the chlorides of the following metals: manganese and tin, and even to a greater degree than these metals, zinc and copper.

The nitrate of lead has a destructive action on the cement.

The most marked increase in the strength of the cement was observed when calcium chloride and calcium nitrate were used. When these salts were incorporated with the cement, the increase in strength in tension after two days was about 20 per cent, and the increase in strength in compression was approximately 50 per cent at two days.

Particularly interesting is the action of certain of the heavy metals, such as copper, zinc and lead. Copper and zinc injure the cement to such an extent that even after a period of two and three days has elapsed, it is still impossible to carry out any strength tests. Active hardening then sets in, so that after 7 and 28 days have elapsed, strength figures are obtained which are approximately equal to the strength figures of the pure cement itself. The action of lead nitrate is completely destructive. Lead nitrate is able to change the entire character of the cement, which is ordinarily perfectly stable as far as its volume is concerned. The samples, placed under water, show wide cracks after a few days and completely distintegrate within a short time. This is an interesting contribution to the problem of disintegration, for according to our present knowledge of the hardening processes, it is impossible to find a scientific answer to the question of why the addition of a couple of per cent of lead nitrate is able to convert a cement whose volume is constant into one which is not.

I studied the action of the anions in the form of their sodium salts, again using equimolecular solutions of the following anions: fluorine, chlorine, bromine, iodine, chloric acid, perchloric acid, iodic acid, sodium peroxide, hydrosulphite, thiosulphate, sulphite, sodium sulphate, sodium nitrite, sodium nitrate, sodium chromate, sodium bichromate, sodium phosphate, sodium arsenate, sodium borate, sodium aluminate, and sodium silicofluoride. Of all of these anions, bromine showed itself to be superior in its action. Bromine increases the strength of the cement to a greater extent than chlorine. Unfortunately, bromine belongs to those substances which have never been employed in large scale commercial operations because of their cost. Otherwise most of the anions have no particularly marked action on the cement.

Only sodium iodate and other salts of iodic acid, sodium phosphate, sodium arsenate and sodium borate, deserve special mention. They reduce the initial strength of the cement to an extraordinarily great degree. These salts are able to reduce the initial strength of the cement in certain instances to zero, as I have mentioned in the case of zinc, lead and copper in the series of anions.

When viewed in its entirety, the investigation, which involved a great deal of work, showed that the initial strength of cement can be affected both by the cathions as well as by the anions, when the salts are used in small amounts. This influence may both be favorable and unfavorable. Except in certain cases, the final strength of the cement is scarcely affected.

Inasmuch as all my experiments were carried out with one cement and always with one and the same concentration of added substance, the influence of the added substances is very likely considerably affected by the concentration. This influence is also dependent on laws that must be determined for each individual substance added. The efforts to find an accelerator of definite influence are not entirely without prospect of success, even if an extraordinarily great amount of time and labor to carry out the investigation are required. All the aforementioned substances must be studied individually as far as their action in varying combination and in different concentrations is concerned. Attention must also be paid to the varying composition of the cement. When you learn that under the most favorable circumstances the strength of cement in compression, tested after several days, can be increased from 58 kilograms per square centimeter to 238 kilograms per square centimeter by the addition of substances of this character, then you will realize that there are possibilities presented here which are well worth while investigating in detail. I intend to carry out these investigations in greater detail and I hope later to be able to make a more detailed report of the results obtained.

Allow me to say in concluding my remarks that the chemistry of special cements also has its negative side. You have seen from the various information that I have presented that there exist quite a number of possibilities of attaining improvements in the quality and properties of cement, particularly with respect to initial strength. The use of such materials, that is, substances which have a favorable effect on the initial strength, naturally involves the assumption that the cements are protected from deterioration, and I was thinking of this when I referred to a possible negative side.

More and more the manufacture of cement is being related to other industrial processes. The development of blast furnace slag cement may be considered as tied up with the iron and steel industry. Today it is the chemical industry which turns its attention to the cement industry, partially for the reason that it desires to utilize troublesome waste products, and partially because it desires to develop new processes of manufacture. The manufacture of portland cement from gypsum in combination with the manufacture of sulphuric acid has long ago emerged from the kindergarten stage. The chemical industry has succeeded in overcoming the difficulty in the manufacture of portland cement from gypsum resulting from the fact that this cement contained a certain proportion of sulphur in the form of sulphide. At the present time the great quantities of lime available, for example, from working up lime nitrogen (calcium cyanamid) into nitrogenous derivatives and that which is recovered in the manufacture of acetylene from calcium carbide, are waste products which are particularly in need of some rational process for their utilization. These lime muds are extraordinarily troublesome by-products in the chemical industry and this burden will become more and more pressing as the importance of the various processes in which these waste products are recovered becomes greater. This condition will eventually lead to the working up of the muds in the proper manner so that they can be utilized not only in the manufacture of cements but also in the manufacture of mortars and similar products. The practical solution of the problem is rendered more difficult because the muds contain a large percentage of water, their composition varies, and they contain many impurities.

You have learned that we are now confronted with a possible revolution in the phosphate industry. In accordance with the newer processes of manufacture, which have been proposed, the phosphates will be worked up into aluminous cement with the aid of coal and bauxite, and the phosphorus, which will be set free during the course of this process, will be recovered and subjected to further transformations. What interests us in this process is the fact that the manufacture of aluminous cement (ciment fondu) on a large scale and as a comparatively cheap by-product of the phosphate industry is estimated to amount to a yearly production of 800,000 tons (metric). Even though the appearance of so great a quantity of aluminous cement on the cement market cannot help but have an effect on it and on the price of cement, yet this danger of reduction in cement prices must not be considered too seriously because of the great difficulties that must be met before such a condition can exist. The presence of phosphides renders the cement completely valueless. It is for this reason that the phosphoric acid must be completely removed from the raw mix. That means that the industry is confronted with a difficult problem in the development of a practical manufacturing process. Crude phosphates frequently contain silica, and a proportion of silica which is altogether too high in the aluminous cement will have a very marked injurious effect on its hardening capacity. The process can be carried out only if the aluminous cement is manufactured with a comparatively high proportion of alumina and a comparatively low proportion of lime.

The development of new manufacturing processes in the chemical industry will result in direct and sensible competition with our older cement industry only when the same or almost the same results are obtained from the standpoint of quality with the new processes as with the older processes of manufacturing portland cement from natural rock. The fact that the chemical industry has to concern itself at the present time with the negative side of the manufacture of cement means that it has to focus its attention on the development of methods to overcome the various disadvantages of its products. This is of considerable importance to the cement industry. It is also significant that the second task of the chemical industry in undertaking the manufacture of cement must be the improvement of the normal products made by its developed processes, and this again gives the cement industry a great advantage. But this advantage must never be considered to be anything else than an advantage in time. It appears to me that the portland cement industry must work energetically to bring out additional improvements and betterments in its products.

Report on Uses of Pozzolanic Materials in Great Britain

It is the general practice in the United Kingdom to use cement in the preparation of high-class building mortar. The reason for this is not because some lime cannot give an adequate mortar without cement, but because cement, being an artificial product, can be procured of a more uniform quality. In Continental Europe this practice is not so general as it is in Britain, and the reason apparently is that natural supplies of pozzolanic material are more plentiful there, and their employment enables mortars to be prepared with confidence that the desired results will be obtained uniformly.

As a consequence the use of pozzolanic material is not very familiar to structural engineers and builders in Britain, and the Building Research Board of the British Department of Scientific and Industrial Research has therefore prepared a useful bulletin on pozzolanas. The bulletin is the joint work of A. D. Cooper and F. L. Brady and it describes the principal sources of pozzolanic materials and the methods for applying and testing them.

A pozzolanic substance, the bulletin states, may or may not be cementitious, but it is characterized by the fact that at ordinary temperatures and in the presence of moisture some of its constituents will combine with hydrated lime to form stable insoluble compounds of cementitious value. When mixed with lime mortar, in addition to or in partial substitution for sand, it will impart hydraulic properties and greater strength.

Numerous natural substances have pozzolanic action, although they do not occur to any considerable extent in the United Kingdom. Granulated blast furnace slag is the most important artificially prepared substance having pozzolanic properties. When ground and mixed with lime it forms what is known as cold-process slag cement, which possesses considerable strength. In one test, for example, five parts of finely ground blast-furnace slag mixed with one part of slaked lime and moulded at a pressure of one ton per square inch gave a crushing point of 2.3 tons per square inch after storage under water for 28 days. When mixed in certain proportions with portland cement to form portland blast-furnace cement, it contains much less free lime after setting than ordinary portland cement. Pounded bricks and tiles, furnace clinkers, and spent oil shale are examples of other by-products which possess pozzolanic properties. Of these the action of furnace clinker is extremely variable, for no reason that has so far been ascertained, and possibly some slight alterations in the process of manufacture may be necessary to enable oil shale to give a uniform product. There is good reason to believe that many clay deposits in the United Kingdom only need light burning in order to develop excellent pozzolanic properties.

Although it is not at present quite clear which ingredient or ingredients in pozzolanic substances cause their characteristic action, the actual effect appears to be that the active ingredients combine with the lime to form insoluble-silicates and aluminates. As a result, pozzolanic mixtures will set under water, and do not require the atmospheric carbon dioxide which is necessary for hardening ordinary fat lime mortar. Such mixtures are consequently comparable with portland and similar cement, and in addition to their hardness and strength, their employment as an ingredient in portland cement concrete gives a vastly improved resistance to the action of sea water and dilute acids.

Pozzolanic material should be ground not less finely than ordinary cement, for its activity increases with its fineness. In the existing uncertainty as to the ingredients of pozzolanic mixtures to which their activity is due, the safest test is said to be the actual mixture with lime and the observation of the behavior of the mixture over a period. The pozzolana to be tested should be mixed with about one-half its weight of dry slaked lime, or a weight of fat lime putty equivalent to this. A mixture of suitable consistency is made into a pat on a glass plate, and left in moist air to set and harden for some weeks, with a control pat of lime putty for the purpose of comparison. The moist air can be obtained by storage in a wooden box, covered with a piece of sacking which is kept wet. In these circumstances both pats will set very slowly, the pozzolanic pat hardening more rapidly than the other. Pozzolanic materials differ widely in their rate of hardening. Granulated slag will probably produce an intensely hard pat in a few days, while clinker or burnt clay may require weeks or even months to give any appreciable degree of hardness, the extent depending among other considerations upon the fineness of the grinding. Slow setting must not be taken as showing the absence of pozzolanic properties. The substitution of pozzolanas, up to a limit, for part of the cement in concrete does not impair the strength of the product, and may even improve it, while it not only increases its impermeability and resistance to sea water and other destructive agencies, but may also considerably reduce its cost.

Merger of North American and Penn-Dixie Off

The Pennsylvania-Dixie and North American Cement Corporations will not merge despite approval of the consolidation by many stockholders of both firms, it has been announced. The insufficient number of North American Cement Corporation 6½ per cent sinking fund series A debentures deposited under the consolidation agreement was apparently the cause.

In a recent statement, Frederick W. Kelley, president of North American, said that no further steps will be taken to bring the concerns together under the name of the General Cement corporation.

"The whole proposition must be looked upon now as an experience," Mr. Kelley said. "We as the directors and servants of the stockholders did what we could to bring the merger about and we had the support of an overwhelming majority of the stockholders. It had been agreed that a certain percentage of the debenture holders in North American must deposit their holdings with an agreement to accept in exchange preferred stock in the new corporation. When we found the bonds had not been deposited in sufficient number to meet that provision, we abandoned the plan."

Japan Engineering Society to Sponsor World Congress

The Engineering Society of Japan has announced that a World Engineering Congress will be held at Tokyo, Japan, in October, 1929, under its auspices. The participation of governmental departments, universities, institutions, associations and individuals is being invited.

Herbert Hoover is honorary chairman and Elmer A. Sperry chairman of the American Committee of the Congress. Maurice Holland, 29 West 39th Street, New York City, is secretary.

Sensitivity of High Explosives to Detonation

An essential characteristic of an explosive is that it shall be sufficiently sensitive always to detonate completely. An insensitive explosive constitutes a hazard because of the danger of drilling into charges of explosive which have partially misfired and the likelihood of a low order of detonation and burning in the borehole. The latter condition usually produces large volumes of poisonous gases and is particularly hazardous in gassy or dusty coal mines where explosions may result. An investigation of the sensitivity of various explosives under actual mining conditions is being made by the United States Bureau of Mines, Department of Commerce, with the idea of devising tests which will provide a measure of this property. Tests in boreholes in a coal mine (cartridges 1 in. in diameter, borehole 1¾ in.) have shown that for three typical permissible explosives detonation will propagate across air gaps of 8, 6, and 1 in. respectively. These distances are not far different from those obtained in paper tubes, but tests in steel tubing have indicated that the diameter of the borehole has a pronounced effect on the length of air space over which detonation will propagate. For example, in a steel tube 1⅜ in. inside diameter gaps as high as 50 in. have been obtained with these same explosives.

The results so far obtained indicate that when cartridges of explosive are of much less diameter than that of the borehole, great care should be taken to insure that the ends of the cartridges are in contact. Otherwise there is danger of incomplete detonation of the charge.

Further work is in progress and the mechanism of the phenomenon is being studied photographically.

British Combine to Use Colored Bags as Cement Containers

Distinctive red sacks are to be used in the future as containers for the portland cement distributed by Portland Cement Selling & Distributing Co., Ltd., the distributing organization of the Ship Canal Portland Cement Manufacturers, Ltd., the British cement combine. Each of the bags holds 1 cwt. of cement and they are made of a special four-ply brown cartridge paper which is stronger than ordinary sacking. The combine has packed its cement in paper bags for a considerable period, but they have formerly been brown in color.

At the combine's annual meeting, recently held in London, Chairman Oliver J. S. Piper said that the net profit for the year amounted to £138,708 ($693,540), as compared with £60,397 ($301,985) for the previous year, and constituted a record in the company's history. Since the date of the balance-sheet the combine has been able to obtain control of the Dunstable Portland Cement Co., Ltd., and Smeed, Dean & Co., Ltd. In connection with these further absorptions Mr. Piper said that there was no idea of becoming monopolistic, but the benefits of such consolidations would be reaped in the way of larger profits being earned as a result of increased internal efficiency. The board aims at having concentrated and centralized control of the large number of cement works now coming under what is known as the Red Triangle Group. The other large British combine, Associated Portland Cement Manufacturers, Ltd., is known as the Blue Circle Group. The output of the two further plants absorbed will be handled by Portland Cement Selling & Distributing Co., Ltd., as are the outputs of the original members of the combine, namely, Greaves, Bull & Lakin, the Holborough Cement Co., and the Ship Canal Portland Cement Manufacturers, Ltd.

The creation of this distributing company to handle the selling side of the business has proved its efficacy, and it has been responsible for a great national advertising campaign for Red Triangle products, and thus for the amazing success of the combine's rapid-hardening cement —Vitocrete.

Portland Cement Statistics in the Southwest

Compilations by the Kansas City Cement Bureau, covering Arkansas, Kansas, western Missouri, Nebraska, Oklahoma and the Texas Panhandle, show that the mills located in this territory shipped into same during the first half of 1928 a total of 3,980,000 barrels of portland cement, as compared with 4,175,000 barrels during the same period of 1927.

At the close of June, 1928, these mills had in stock approximately 1,565,000 barrels of finished portland cement, as compared with 1,740,000 barrels at the close of June, 1927.

On June 30th, 1928, the mills reporting to the bureau had unshipped commitments on contracts for specific jobs in the above territory of approximately 1,300,000 barrels of portland cement, as compared with approximately 1,700,000 at the close of June, 1927.

Cement Statistics for June

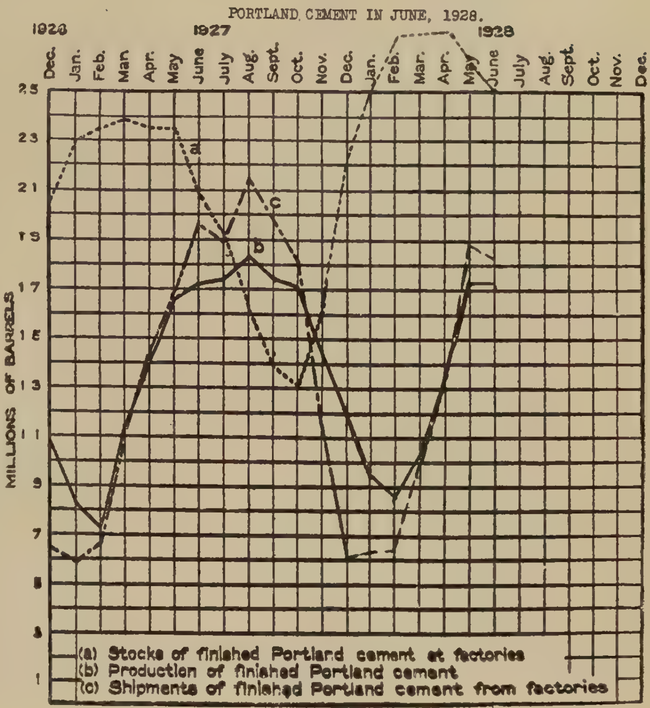
THE portland cement industry in June, 1928, produced 17,469,000 barrels, shipped 18,421,000 barrels from the mills, and had in stock at the end of the month 25,021,000 barrels, according to the United States Bureau of Mines, Department of Commerce. Production of portland cement in June, 1928, showed an increase of 1.4 per cent and shipments a decrease of 6.8 per cent, as compared with June, 1927. The total production for the first half of 1928 amounts to 77,005,000 barrels, compared with 75,058,000 barrels in the same period of 1927, and the total shipments for the first half of 1928 amount to 73,953,000 barrels, compared with 74,775,000 barrels in the same period of 1927.

The statistics are compiled from reports for June from all plants except two for which estimates are included in lieu of actual returns. They include the output of another new plant, in Tennessee, which began operating during the month.

In the statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 158 plants at the close of June, 1928, and of 148 plants at the close of June, 1927.

Relation of Production to Capacity

	June 1928	June 1927	May 1928	April 1928	March 1928
	Per cent	Per cent	Per cent	Per cent	Per cent
The month	90.1	93.1	86.6	70.0	51.7
The 12 months ended	73.8	74.3	73.9	74.0	74.6



Production, Shipments and Stocks of Finished Portland Cement, by Months and by Districts, 1927 and 1928, and Stocks in May, 1928

Month—	Production 1927	Production 1928	Shipments 1927	Shipments 1928	Stocks at end of month 1927	Stocks at end of month 1928
January	8,258,000	9,768,000	5,968,000	6,541,000	22,914,000	25,116,000
February	7,377,000	8,797,000	6,731,000	6,563,000	23,563,000	27,349,000
March	11,450,000	10,223,000	11,100,000	10,135,000	23,922,000	27,445,000
April	14,048,000	13,468,000	14,350,000	13,307,000	23,654,000	27,627,000
May	16,701,000	17,280,000	16,865,000	18,986,000	23,503,000	*25,972,000
June	17,224,000	17,469,000	19,761,000	18,421,000	20,972,000	25,021,000
July	17,408,000		18,984,000		19,397,000	
August	18,315,000		21,411,000		16,292,000	
September	17,505,000		19,828,000		13,996,000	
October	17,174,000		18,105,000		13,141,000	
November	14,449,000		11,619,000		16,022,000	
December	11,999,000		6,200,000		22,082,000	
	171,908,000		170,922,000			

---

*Revised.

District—	Production—June 1927	Production—June 1928	Shipments—June 1927	Shipments—June 1928	Stocks at end of June 1927	Stocks at end of June 1928	Stocks at end of May, 1928*
Eastern Pennsylvania, New Jersey, Md.	4,091,000	4,056,000	4,745,000	4,081,000	4,394,000	6,129,000	6,153,000
New York and Maine†	1,148,000	1,208,000	1,307,000	1,264,000	1,536,000	1,843,000	1,899,000
Ohio, Western Penn., and West Virginia	1,716,000	1,711,000	2,162,000	1,759,000	2,953,000	3,434,000	3,482,000
Michigan	1,580,000	1,456,000	1,804,000	1,731,000	1,971,000	1,964,000	2,240,000
Wisconsin, Illinois, Indiana, and Kentucky	2,387,000	2,436,000	3,086,000	2,443,000	2,432,000	3,004,000	3,011,000
Virginia, Tenn., Ala., Ga., Fla., and La.	1,414,000	1,391,000	1,357,000	1,409,000	1,206,000	1,858,000	1,876,000
Eastern Missouri, Iowa, Minn., and So. Dak.	1,467,000	1,715,000	1,927,000	2,109,000	2,841,000	3,131,000	3,524,000
Western Missouri, Nebraska, Kansas, Okla.	994,000	1,055,000	976,000	1,058,000	1,743,000	1,570,000	1,573,000
Texas	469,000	540,000	454,000	573,000	330,000	356,000	389,000
Colorado, Montana, and Utah	268,000	275,000	233,000	299,000	541,000	486,000	510,000
California	1,322,000	1,206,000	1,294,000	1,255,000	601,000	820,000	869,000
Oregon and Washington	368,000	420,000	416,000	440,000	424,000	426,000	446,000
	17,224,000	17,469,000	19,761,000	18,421,000	20,972,000	25,021,000	25,972,000

---

*Revised. †Maine began producing April, 1928, and shipping May, 1928.

MEN and MILLS

Notes from the Field

New Ideal Cement Plant Planned

The Ideal Cement Company of Denver will erect a new cement mill in Howard county, Arkansas, about five miles south of Schaal. This places it near the Texas line.

Schaal is located on the Graysonia, Nashville and Ashdown railroad, the Ideal having purchased the railroad and at the mill site there is an abundance of raw material. The finished product will be transported to Ashdown where the Graysonia connects with the Missouri Pacific, or to Shawmut where connection is made with the Kansas City Southern and the St. Louis-San Francisco railroads.

The mill will be one of 200,000 barrel capacity. Natural gas will be used as fuel. Both Arkansas and Texas have approved of numerous concrete roads and it is likely that most of the product will be bought by these states until the work is completed. The road work is estimated to cost $50,000,000.

Cement Securities Find Ready Demand

Out of a total of 77,254 shares of stock of the Ideal Cement Company, all but 2,113 shares had been tendered in exchange for its new 5 per cent debentures, up to July 2nd. Some of the stock not tendered is held by people who are in Europe.

Of the total offering of $8,500,000 in debentures exchanged at a ratio of 11 to 10 for the preferred stock all but $250,000 was absorbed in the exchange. Subscriptions for the $250,000 remaining were subscribed to by over $1,000,000 and the offers came from present stockholders. It was necessary to return $750,000.

South Georgia Seeks Reduced Freight Rate

Reductions of freight rates on cement ranging from 5 to 10 per cent between points in Georgia are sought in a petition filed with the state public service commission recently by the South Georgia traffic bureau.

The petition claims that cement users of Georgia will be placed under a hardship unless the requested reductions in rates are granted.

F. L. Stone New General Sales Manager of Universal

F. L. Stone has been appointed sales manager of the Universal Portland Cement Co. He succeeds Blaine S. Smith who recently resigned to become president of the Pennsylvania-Dixie Cement Corporation.

Subsequent appointments announced by Universal are as follows: A. C. Cronkrite, assistant general sales manager; Edward Quebbeman, western sales manager; W. L. Greenly, division sales manager for Chicago; Harry A. Craig, division sales manager for Illinois and Missouri; Earle D. McKay, division sales manager at Duluth.

Now in his eighteenth year with the Universal company, the new general sales manager started as a salesman. He later became successively chief clerk, assistant sales agent and division sales manager. For the last ten years he has been assistant general sales manager.

Becoming a Chicagoan in 1911, Mr. Stone had previously been in newspaper work in Denver and life insurance at Charlotte, N. C. His business life started with the New York Telephone Company in New York City where he lived about 13 years.

Mr. Stone was born at Camden, Ark., and was educated at the University of the South, Sewanee, Tenn., and at the United States Naval Academy, Annapolis. He is a member of the Chicago Club, Hamilton Club, Executives Club, Indiana Society, Exmoor Country Club and Kappa Sigma fraternity.

Pierson Appointed Indiana Manager to Succeed MacBride

G. E. Pierson has been appointed manager of the Indiana Portland Cement Company, Indianapolis, Indiana. He is assuming the management of this company in addition to his present duties as sales manager. Mr. Pierson succeeds D. S. MacBride, formerly vice-president and manager and now vice-president, located at Philadelphia.

Mr. Pierson went to Indianapolis two years ago from Kansas City, where he had acted for a number of years as sales manager of the Kansas Portland Cement Company. He has been identified with the cement industry for more than fifteen years.

Regional Safety Meeting at Albany, N. Y.

A regional safety meeting of the Portland Cement Association was held at Albany, New York, on June 12th, at which Jas. E. Gheen, executive manager of the Albany Chamber of Commerce was the luncheon speaker. John J. Porter, of the North American Cement Corporation, was chairman of the meeting and Thomas Avinso, general superintendent of the International Cement Corporation, presided at the luncheon.

Morning addresses were: "Careless Characters," by F. E. Redmond, director of the education bureau, Associated Industries of New York State; "Good Lighting as an Aid to Plant Safety," by R. B. Morrison, General Electric Company, and "How to Win a Trophy," by W. G. H. Cam, power and safety engineer, Canada Cement Company.

The meeting was resumed at 2 p. m. with a competitive resuscitation drill, of which Peter Bozzone was the judge.

"Every Employee a Safety Committee" was the subject presented by J. J. Sullivan, employment agent of the New York and New England Cement and Lime Company.

G. F. Bayle, Jr., vice president of the Glens Falls Portland Cement Company, was toastmaster at the dinner and G. S. Brown, president of the Alpha Portland Cement Company and of the association, was the dinner speaker.

The committee was composed of R. A. Dittmer, E. S. Hill, H. H. Kessler, E. H. Parry, J. J. Porter, E. L. Snyder, and E. F. Werner.

Lehigh Deeds Land to State of Indiana

A gift to the state of Indiana of 288 acres of rolling timber land in Lawrence County, Indiana, has been made by E. M. Young, president of the Lehigh Portland Cement Company.

The land will go toward the formation of a state park.

Lehigh Dividend

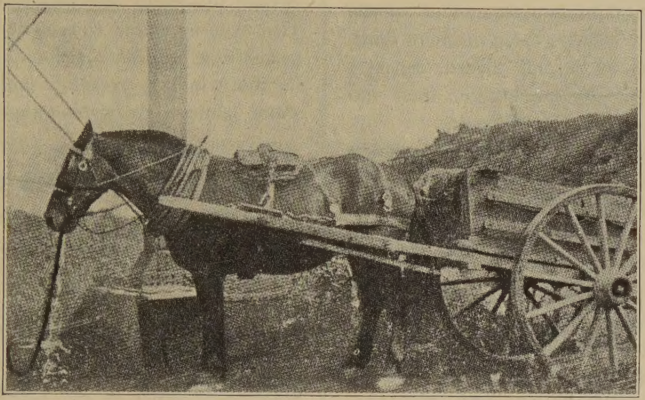
The Lehigh Portland Cement Company on June 25th declared a dividend of 1¼ per cent or 62½ cents per share on common stock, payable August 1st to stockholders of record July 14th.

Old Frank Has "It"

"OLD Frank" is a horse who possesses what is known as "it." He was purchased by the Knickerbocker Portland Cement Co., Inc., in 1911, at a cost of $225, according to an item in a recent issue of the International Cement Corporation's Bulletin. Conscientious accounting has whittled away at Frank's "appraisal value" to the tune of 6¼ per cent "annual depreciation," and Old Frank's financial standing has shrunk to $100 on the company's books. But the auditor hasn't done right by our Frank. Old wine and Old Frank don't depreciate—both improve with age.

Old Frank is a little choosy about his drinking habits. He hasn't definitely stated his views on prohibition, but he has a habit, when thirsty, of going over to a rubber hose and waiting until some one turns the water on and puts the hose in his mouth. Old Frank is the kind who believes in moderation: he knows when he has had enough. He simply drops the hose— and if a bystander gets a wetting it doesn't keep Old Frank awake at nights. He really seems to laugh behind those big, kind eyes of his.

Old Frank turns up his nose at a menu consisting of hay and oats, but he partakes quite freely of cake, pie, fruit, and pickles. Indulgence in tobacco is not one of his vices. When workmen at the Knickerbocker plant offer him a chew, he definitely shows his displeasure.



Yet there is one defect in this paragon. Old Frank is a clock watcher. At 11:30 A. M. and 5:00 P. M. he quits. He heads for the barn. He wants food and gets it.

Old Frank attributes his success to strict attention to business and his ability to get on agreeably with his co-workers.

Phoenix Plant Acquisition Announced by Alpha House Organ

Its acquisition of the Phoenix Portland Cement Corporation is announced by the Alpha Portland Cement Company in its publication, "Alpha Aids," in a notice addressed especially to the southern buying public. The new plant, the announcement says, will be known as the "Morton" plant of the Alpha System and will increase the productive capacity of the company to 12,500,000 bbls. annually.

It is also stated that of late years the Alpha company has not shared in the cement business in the Southeastern and Gulf states because high freight rates prohibited competition with southern plants and that with its new property it will again serve the South.

Lindley Morton, former Phoenix president, is retiring from the cement business in order to devote himself entirely to his large personal interests, the announcement states. R. J. Hawn, former vice-president, is also retiring from the company. No other change in personnel is to be made. In this connection, S. C. McCurdy has been appointed southern sales manager for the Alpha Portland Cement Company, with offices in the Alabama Power Building, Birmingham.

J. A. Zahn Honored

J. A. Zahn, secretary of the United States Portland Cement Company, was selected to represent the Denver Chamber of Commerce at the Glenwood Springs, Colorado, meeting of the Western Shippers Advisory Board of the American Railway Association recently.

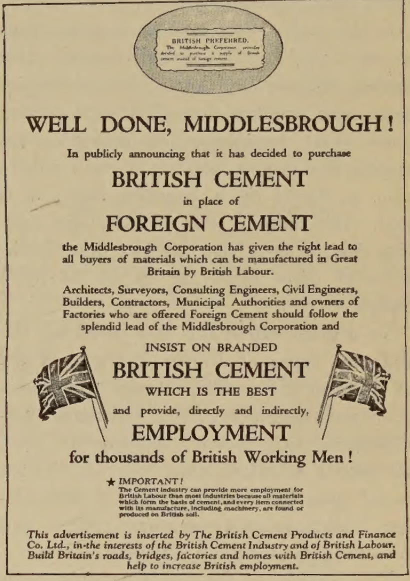
Installing Large Kiln in Monolith Plant

The Monolith Portland Midwest Company in erecting its plant, at Laramie, Wyoming, will install a kiln 334 feet long, 11½ feet in diameter, with a daily capacity of 2,500 barrels of cement.

Change in Florida Rates Sought by Railroads

A realignment placing intrastate rates on a parity with those interstate being sought by railroads before the Florida state railroad commission would mean an increase in the price of cement to the consumer. While the general trend is upward, the adjustments asked would result in both increases and reductions in the rate.

The Florida Portland Cement Company was represented by J. B. Johnson, and other companies having plants in the state had spokesmen present.



BRITISH PREFERRED.

WELL DONE, MIDDLESBROUGH!

In publicly announcing that it has decided to purchase

BRITISH CEMENT

in place of

FOREIGN CEMENT

the Middlesbrough Corporation has given the right lead to all buyers of materials which can be manufactured in Great Britain by British Labour.

Architects, Surveyors, Consulting Engineers, Civil Engineers, Builders, Contractors, Municipal Authorities and owners of Factories who are offered Foreign Cement should follow the splendid lead of the Middlesbrough Corporation and

INSIST ON BRANDED

BRITISH CEMENT

WHICH IS THE BEST

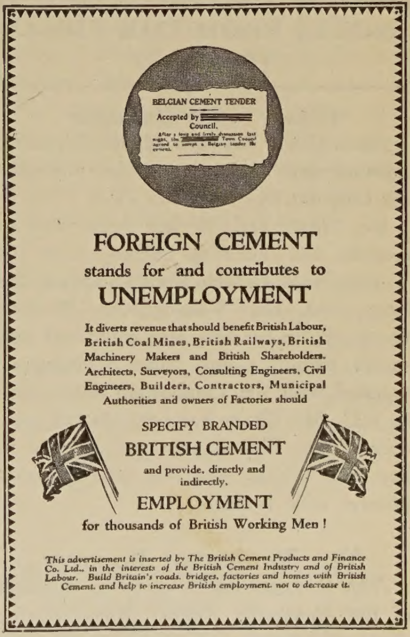
and provide, directly and indirectly,

EMPLOYMENT

for thousands of British Working Men!

★ IMPORTANT! The Cement industry can provide more employment for British Labour than most industries because all materials which form the basis of cement, and every item connected with its manufacture, including machinery, are found or produced on British soil.

This advertisement is inserted by The British Cement Products and Finance Co. Ltd., in the interests of the British Cement Industry and of British Labour. Build Britain's roads, bridges, factories and homes with British Cement, and help to increase British employment.



BELGIAN CEMENT TENDER

Accepted by [redacted] Council.

FOREIGN CEMENT

stands for and contributes to

UNEMPLOYMENT

It diverts revenue that should benefit British Labour, British Coal Mines, British Railways, British Machinery Makers and British Shareholders. Architects, Surveyors, Consulting Engineers, Civil Engineers, Builders, Contractors, Municipal Authorities and owners of Factories should

SPECIFY BRANDED

BRITISH CEMENT

and provide, directly and indirectly,

EMPLOYMENT

for thousands of British Working Men!

This advertisement is inserted by The British Cement Products and Finance Co. Ltd., in the interests of the British Cement Industry and of British Labour. Build Britain's roads, bridges, factories and homes with British Cement, and help to increase British employment, not to decrease it.

In no uncertain terms do British cement interests urge the user of cement to buy only the home product. These are reproductions of advertisements appearing in a British builder's journal

Mill Equipment

Aluminum Cases Are Now Standard on Brown Instruments

The Brown Instrument Company, Philadelphia, Pennsylvania, has adopted as standard the furnishing of aluminum cases for its recording thermometers and pressure gauges. The company has of late been swinging over gradually from cast iron instrument cases to those of aluminum die castings for practically all models of its instruments.

In the preliminary work in this direction a number of the die castings required presented difficult problems. The aluminum cases now standard for all Brown continuous chart recorders, for example, are among the largest aluminum die castings ever produced on a quantity basis, it is said. The unusual size of these die castings may be seen from the fact that dimensions of these cases are 15 by 13 by 7 inches.

To a great extent the cases used for the different types of Brown instruments are of uniform dimensions. Brown continuous chart recording pyrometers, resistance thermometers, CO_2 meters, tachometers, etc., all take a standard case. So, too, Brown round case instruments, such as flow meters, thermometers, pressure gauges and vacuum gauges all use standard cases.

This change to die-cast aluminum cases assures instrument cases that are closely uniform in dimensions and quality, rustproof, resistant to corrosion, free from flaws, economical of freight and express charges, and easy to handle in installation, the manufacturer says.

NOTES FROM THE FIELD
(Continued)

Cleary Sales Manager

James Cleary has been appointed general sales manager of the *Combustion Engineering Corporation*, New York City.

Mr. Cleary early in his career was an erecting and operating engineer with the Westinghouse Church Kerr Company, and later with the Westinghouse Machine Company. He has also been connected with various western plants. Since becoming associated with the Combustion corporation in 1921, Mr. Cleary has been district manager of the Philadelphia and Detroit offices and for the past two years assistant general sales manager.

New Manhattan Manager

John S. Latta has resigned as manager of the *Manhattan Rubber Manufacturing Company* branch at Philadelphia, Pa. He is succeeded by *David Newall.*

The main office of the company is at Passaic, N. J.

2-Yd. Shovel New Link-Belt Unit

To its line of larger size crawler cranes, shovels and draglines, the Link-Belt Company had added a full 2-yard capacity shovel. This is ½ yard larger than the equipment available in the past.

The Link-Belt K-55, as the new machine is known, is a powerful, heavy duty, all-purpose, 2-yard machine, primarily designed for the following adaptations:

Shovel, with 30-foot boom and 18-foot dipper stick carrying a 2-yard struck-measure-capacity all-manganese-steel dipper; dragline, handles 2-yard dragline bucket, for medium and medium heavy excavating, on boom 50 feet long, or a 1½-yard dragline bucket on boom 60 feet long.

All attachments are interchangeable without removing or disturbing the mechanism of the machine proper, it is said.

Roller Bearing Equipment on James Speed Reducers

New speed reducers developed by the D. O. James Manufacturing Company, Chicago, are fully equipped with anti-friction Hyatt roller bearings on the high, intermediate and slow speed pinion shaft and Timken roller bearings on the slow speed gear shaft. They are known as the James generated continuous-tooth herringbone speed reducers, and are made in both single and double types.

Wagner Motor Enclosed in Jacket; Fan Blades on Shaft Extension

A motor entirely surrounded by a jacket open at both ends with fan blades on a shaft extension, between the sealed motor and its outer jacket has been developed by the Wagner Electric Corporation, St. Louis, Missouri. The only clearance between rotating and stationary parts of the motor is in the bearing housing.

The motors are new in external construction only, no changes having been made in the electrical principles of the motors themselves. The frame housing, the motor proper and all bearings are claimed to be air-tight. The end shield is made of cast iron, rib-reinforced and has a grating which protects the fan and provides an opening for incoming ventilating air. The center shield is made of heavy sheet steel held in place by slot head bolts. The fan is of one-piece construction. The conduit box is mountable in four positions.

The stator is the only part of the standard single-phase repulsion-induction and polyphase squirrel-cage motors subject to change in design, the manufacturer states. The exposed outer rim is deeply grooved to increase radiation surface. The punching for windings remains unchanged. The stator laminae are welded together.

Switch Mountable on Any Starter Developed by General Electric

For application where it is desirable to control a magnetic switch at the switch itself, the General Electric Company has designed two small control switches. These may be mounted in the knockouts of the enclosing case of any starter and are held rigidly in place by a conduit bushing which forms part of the switch.

One type, bearing the designation SY-103-A, is a maintaining-contact type whose action is similar to a single-pole, double-throw switch. It is provided with three positions, "Hand," "Off" and "Automatic." The most general application of this switch is expected to be in connection with refrigerating machines controlled by thermostats, but it can also be used where float switches, pressure governors, etc., are used in the same manner as a thermostat in various applications. When the operating lever of this switch is in the "Automatic" position, the thermostat, float switch or governor controls the machine. On the "Hand" position the machine runs continuously, and in the "Off" position the control circuit is opened.

The second type of switch bears the designation SY-104-A and is a two-position, momentary-contact switch provided with the positions "Start" and "Stop." This is the equivalent of the usual push-button station of the same marking. It is most applicable where starting and stopping of the motor is necessary at the magnetic switch itself.

Both switches are equipped with leads ready to wire and have sufficient capacity to handle any magnetic starter up to 75 amperes capacity. The new switches can be used on 600-volt circuits with safety, as their insulation is designed for maximum safety to the operator.

With the Manufacturers

NOTES FROM THE FIELD

Boiler Pressures Discussed

The increasing high pressures being used by industries was one of the principal topics of discussion at the regular annual sales meeting of the *Edge Moor Iron Company* held in June at Edge Moor, Pa.

High pressure boilers of recent manufacture include two of 825 boiler h.p. and 512 h.p., both installed in paper making plants, and another of 665 h.p., used in a tobacco plant. All are of the cross drum box header type, it is reported.

The Edge Moor sales meeting was attended by salesmen from Chicago, New York, Boston, Southern and Pennsylvania territories.

A. S. M. E. Honorary Membership

The American Society of Mechanical Engineers has recently awarded an honorary life membership to *Captain B. M. Mitchell,* president of the *Conveying Weigher Company* and consulting engineer for the *Manhattan Rubber Manufacturing Company.* The award was made in recognition of numerous engineering achievements, particularly in innovations in the construction of power developments.

Locomotive Works Sold

Announcement has been made of the purchase of the *Midwest Locomotive Works,* Cincinnati, Ohio, by the *Columbia Machine Tool Company* and the *Ceramic Machinery Company,* followed by its removal to Hamilton, Ohio.

Three- to fifteen-ton locomotives are now manufactured and larger sizes will be added to the line shortly.

Botfield Products in Toledo

The Builders and Industrial Supply Company, 4090 Detroit Street, Toledo, Ohio, has been appointed its distributor for that vicinity by the *Botfield Manufacturing Company,* Philadelphia, Pa.

The latter is the manufacturer of *Adamant* fire brick cement and gun, and *Adacrome* and *Adachrome* fines.

Quenching System Official

H. D. Savage, president of the *Dry Quenching Equipment Corporation,* announces the election of *D. W. Wilson* as vice-president and general manager.

The Dry Quenching Equipment Corporation, a subsidiary of *International Combustion Engineering Corporation,* was organized to exploit in this country the *Sulzer* system for the dry quenching of coke. The *Sulzer* system is a means of quenching the coke produced by by-product coke ovens and gas retorts in such a way as to reclaim and put to useful work a large part of the sensible heat content of the coke.

The system has been installed in many plants in Europe and an installation has been in operation for over a year at the Rochester Gas & Electric Company, Rochester, N. Y. Plans are now actively under way for several large installations in this country, it is said.

Sectional Chairman

C. P. Potter, engineer in charge of large motor and transformer divisions of the *Wagner Electric Corporation,* St. Louis, Missouri, was elected chairman of the St. Louis Section of the A. I. E. E., an honor bestowed upon him in recognition of his many years of activity in the organization.

INDUSTRIAL LITERATURE

Jones Gear Publication

The W. A. Jones Foundry & Machine Company, Chicago, has published a handy size, 24-page booklet giving a description of an improved method of generating herringbone gears.

The publication, known as *Catalog* 36, shows tooth forms, dimensions, price lists in cast iron and steel for recommended face widths, and horsepower tables for open gearing.

Oxwelded Pipe Systems

A 10-page booklet entitled "Oxwelded Industrial Piping" is a new publication of the *Linde Air Products Company,* New York City. It describes, explains and defines clearly economies in the construction, repair and maintenance of oxwelded pipe systems. Illustrations are profuse.

On Switches

"E. C. & M. Type ZO Switches for Across-the-Line Starting," is the title of a broadside published by the *Electric Controller & Mfg. Co.,* Cleveland, Ohio.

The switch is designed for a. c. motors up to 10 h.p. across-the-line. The switches are said to be dustproof and able to work continuously in dust-laden atmosphere.

Invaluable Conveying and Other Data

What amounts to a textbook on conveying, elevating and chain transmission has been published as *General Catalog* 500, by the *Link-Belt Company* of Chicago, Indianapolis, and Philadelphia. It covers engineering data and list prices of the complete chain, sprocket, power transmission, elevating and conveying and engineering divisions of the business.

The purpose of its compilation, and particularly of the engineering data, was to enable engineers to design plants of a standard character without other aid and to supply price lists complete to a point permitting the experienced buyer to determine the net prices of purchases.

Baffle Wall Bulletin

The *Turner* boiler baffle wall and its newer companion, the *Beco* baffle wall, are the subjects of a bulletin published by the *Boiler Engineering Company,* Newark, New Jersey.

The bulletin contains profuse illustrations, photographs and text on both baffles. Numerous actual installation photographs of the *Beco* baffle are shown in all makes and types of water tube boilers.

Fuel Burning System

The Lopulco Unit System, "a direct-fired system with a background," for burning pulverized fuel, is the subject of a 28-page catalog published by the *Combustion Engineering Corporation.*

The catalog contains illustrations and descriptive matter covering different types of horizontal, vertical and tangential burners used with this system, in addition to a number of application drawings.

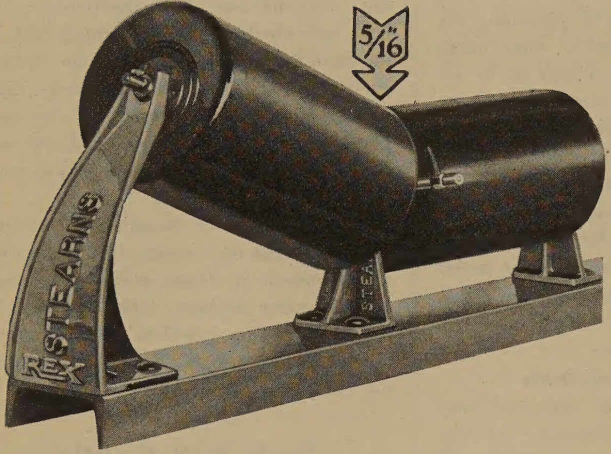
General Electric Publications

The General Electric Company, Schenectady, N. Y., has published a four-page loose-leaflet on its squirrel-cage induction motors, with riveted frame. The publication is numbered *GEA 457A.* Others, on the *CR7006-D31* magnetic switch and sheath-wire resistor units are *Nos. 869* and *961.*

Efficiency of Screen Openings

A booklet published by the *Ludlow-Saylor Wire Company,* St. Louis, Mo., contains a discussion of screen openings, including a comparison of square screen openings with the larger round openings required to make the same separation.

Self-Service for Conveyors



It's an age of independence—service, yes—but service only where it's really required—*self-service* whenever possible.

Well, Stearns has built the self-service idea into belt conveyors—the ordinary conveyor often needs daily lubrication—Stearns usually needs it only *twice a year*—that's because Stearns idlers are equipped with *Timken Roller Bearings*—and because the Stearns Labyrinth Grease Seal keeps grease in *and keeps dirt out*—Stearns takes care of itself—it doesn't need the grease gun nursing demanded by ordinary conveyors.

Belts wear longer because the $\frac{5}{16}$-in. spacing between interchangeable units makes creasing impossible—belting costs make up 40% of the bill on belt conveyor installations.

Write now for free Booklet S1, giving full details of Stearns structure—then put in Stearns and throw your grease gun in the junk heap.

Philadelphia Branch Chain Belt Co.

Robert L. Latimer & Company
24 to 28 N. Front St., Philadelphia, Pa.

The "Latimer Line" of Double-Checked Excavating, Conveying and Power Transmission Equipment, Belting, Hangers, Pulleys, Mill Supplies, Fafnir Ball Bearings, D. O. James Speed Reducers.

IMPORTANT!

Fill out the coupon and we will put you on the mailing list for the "Latimer Engineering News Bulletin." This bulletin is issued monthly and contains important news of scientific progress in the industrial world. We gladly mail it without charge.

- - - - - COUPON - - - - -

Robert L. Latimer & Co.
24 to 28 N. Front St.
Philadelphia, Pa.

Please put me on Free Mailing List for "Latimer Engineering News Bulletin."

Name..........

Address..........

Concrete—August, 1928

British Cement Manufacturers Review Progress in Plants

At the annual general meeting of the British Portland Cement Manufacturers, Limited, recently held in London, the chairman, P. Malcolm Stewart, gave some very interesting details regarding the company's unrivaled distribution facilities. He referred to the scope of the operations of the British company, the salient features of which are that it owns and operates a far greater number of plants than any other company in the United Kingdom. Apart from having plants on the north and south banks of the Thames and Medway, it owns works in the counties of Sussex, Surrey, Cambridgeshire, Middlesex, Bedfordshire, Northants, Yorkshire, Glamorganshire, as well as a plant in the North of Ireland, near Belfast. Hence the unrivaled means of distribution.

To keep abreast of the times the company has embarked upon a considerable program of reconstruction and extensions at various works. Martin Earle and Company's works have already been brought up to date. Two modern kilns are in operation, six old ones and the steam power plant having been scrapped. Electric power, purchased under contract, has been installed, and the most modern excavating and wash mill plant installed in the quarry. These improvements have resulted in a complete unit up to date, and have effected considerable reduction in manufacturing costs. A second rotary kiln has been erected at the Sunson Works, in Bedfordshire, displacing a small kiln and shaft kilns. At the Wouldham Works, where the well-known Maltese Cross brand is manufactured, a large rotary kiln is being installed and the washing plant reorganized, the additional electric power required being purchased from the County of London Electric Supply Company, Limited, whose cables pass the works. The work being undertaken here is considerable but it is hoped that it will be entirely completed before the end of the year.

The Johnsons Works are being reconstructed and extended, and benefiting by the experience gained by the Associated Portland Cement Manufacturers Limited, at Bevans, the natural facilities which the factory site offers are being turned to good account, since it has a deep water jetty and ample raw materials are available. Two long kilns are being erected, and the productive capacity will be brought up to 7,000 tons weekly. New washing and grinding plants and concrete silos are being erected. Arrangements have been made with the Associated Cement Manufacturers, Limited, to extend their Kent power plant, a very efficient installation, to enable them to supply the whole of the electrical power required on the Johnsons works. This concentration of power plant in one unit will decrease the cost of producing electrical power to the advantage of both companies. It is thus made quite clear that the Johnsons works are being entirely remodeled and will then be as modern and efficient as any in the country.

At Hope, in Derbyshire, the construction of a model works has been commenced, and this will be operated by the old established firm of G. and T. Earle, Limited, of Hull, which will enable them to supply the ever increasing demand for their Pelican brand in the thickly populated Manchester and Sheffield districts. Ample reserves of limestone and clay have been purchased.

Uruguay May Tax Cement

The advisability of taxing portland cement is being given consideration by Uruguay. The income would be used to defray the cost of building a school of architecture and to provide quarters for a Fine Arts Museum.